TECHNOLOG

Devoted to
TEXTILE
CHEMISTRY
BLEACHING
DYEING
PRINTING
FINISHING

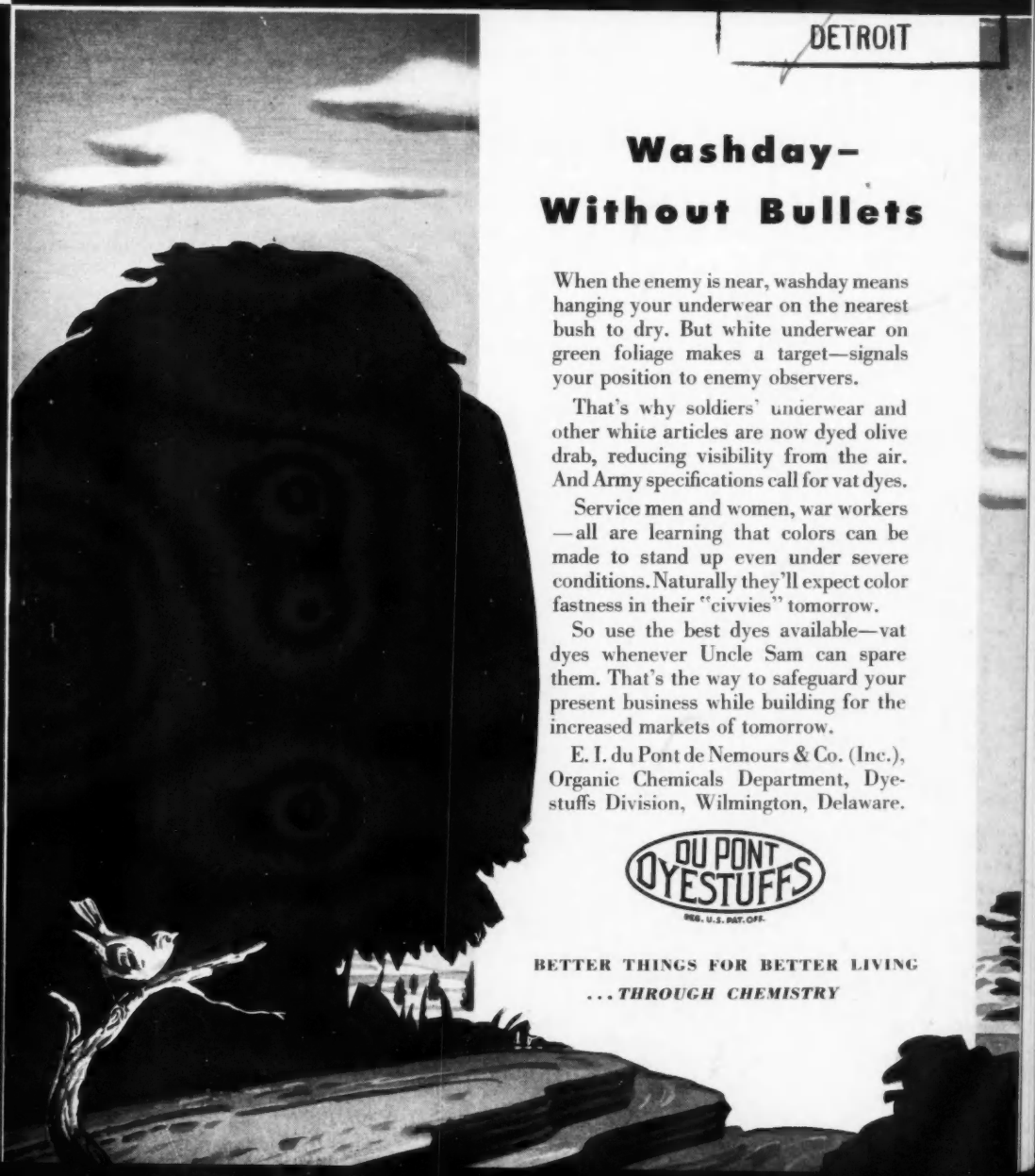
LY 19, 1943
LUME 32, No. 15

AMERICAN

DYESTUFF REPORTER

FICIAL PUBLICATION
of the
PROCEEDINGS
ERICAN ASSOCIATION
TEXTILE CHEMISTS
AND COLORISTS

DETROIT



Washday—
Without Bullets

When the enemy is near, washday means hanging your underwear on the nearest bush to dry. But white underwear on green foliage makes a target—signals your position to enemy observers.

That's why soldiers' underwear and other white articles are now dyed olive drab, reducing visibility from the air. And Army specifications call for vat dyes.

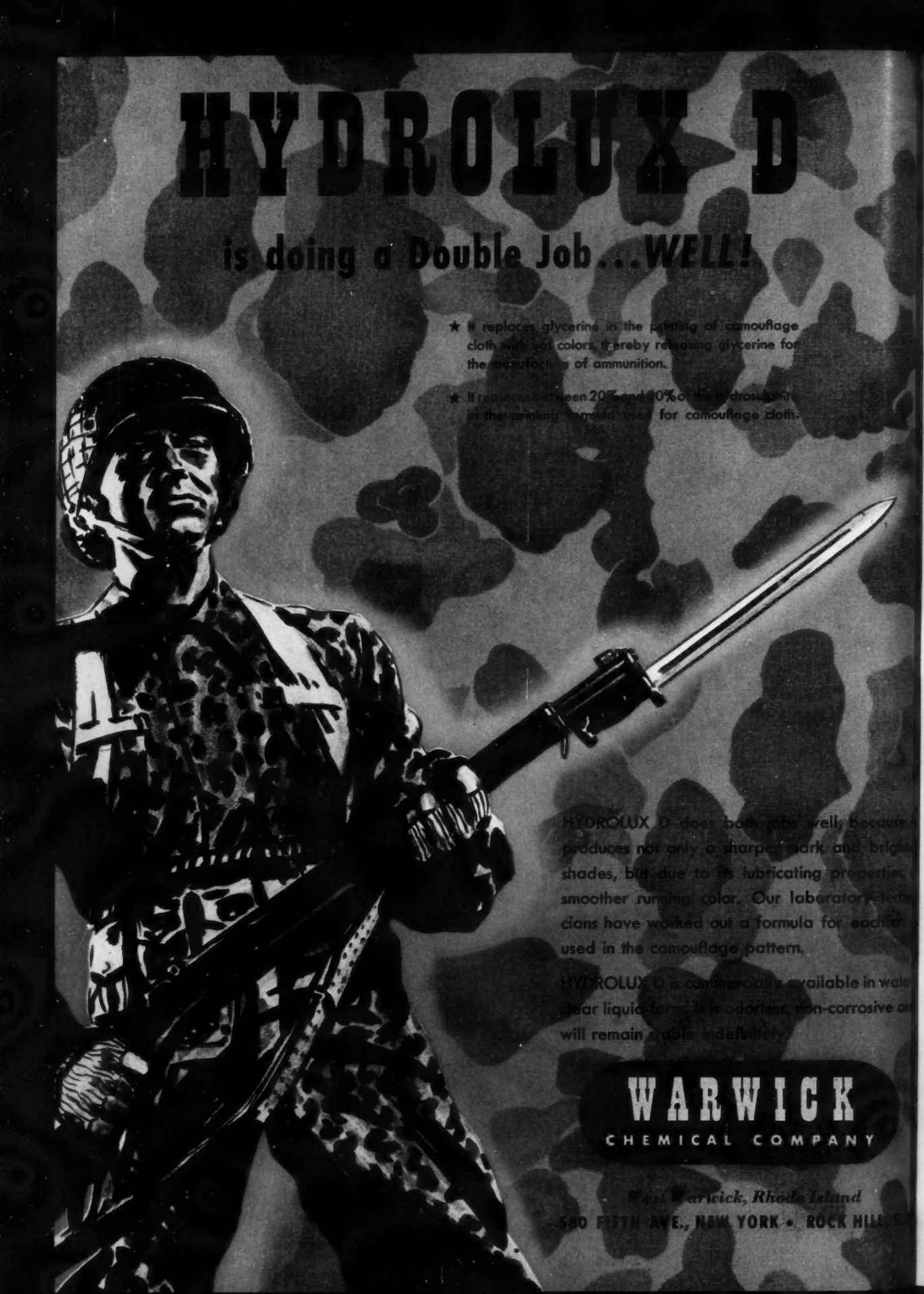
Service men and women, war workers —all are learning that colors can be made to stand up even under severe conditions. Naturally they'll expect color fastness in their "civvies" tomorrow.

So use the best dyes available—vat dyes whenever Uncle Sam can spare them. That's the way to safeguard your present business while building for the increased markets of tomorrow.

E. I. du Pont de Nemours & Co. (Inc.), Organic Chemicals Department, Dyestuffs Division, Wilmington, Delaware.

DU PONT DYESTUFFS
REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY


HYDROLUX D
is doing a Double Job...WELL!
★ It replaces glycerine in the printing of camouflage cloth with vat colors, thereby releasing glycerine for the manufacture of ammunition.
★ It replaces between 20% and 40% of the hydrosulphite in the printing formula used for camouflage cloth.
HYDROLUX D does both jobs well, because it produces not only a sharper, dark and bright shades, but due to its lubricating properties, smoother running color. Our laboratory technicians have worked out a formula for each of used in the camouflage pattern.
HYDROLUX D is commercially available in wate clear liquid form. It is odorless, non-corrosive a will remain stable indefinitely.
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New York,
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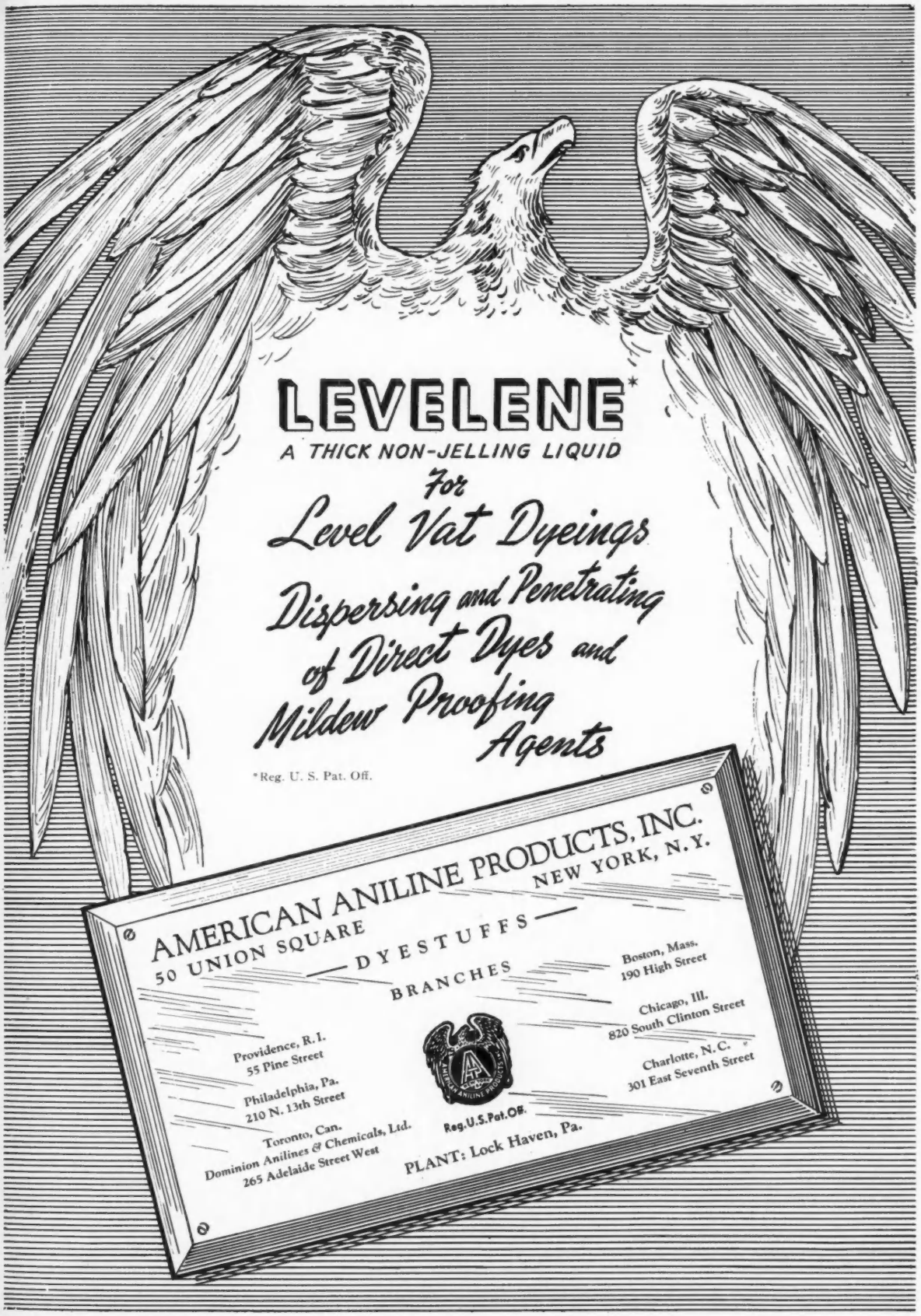

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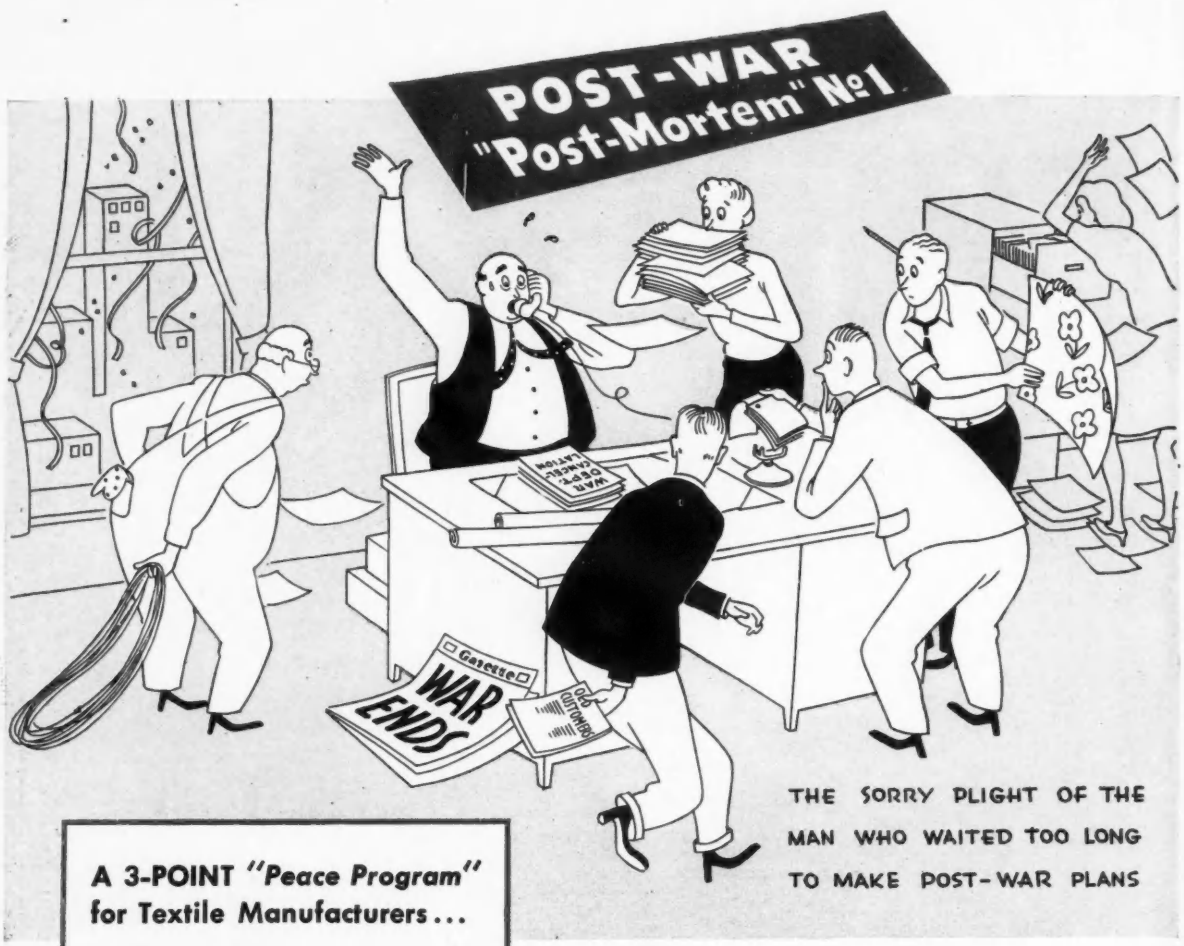


THE SORRY PLIGHT OF THE MAN WHO WAITED TOO LONG TO MAKE POST-WAR PLANS

A 3-POINT *"Peace Program"* for Textile Manufacturers...

1 Make your post-war plans NOW
don't let peace catch you without definite plans for products, markets, sales and production.

2 Decide on new equipment needs NOW
don't wait until the war is over before making a thorough survey of your production equipment and deciding what machines must be replaced.

3 Order your new equipment NOW
don't risk serious delay in securing necessary new equipment for post-war production. Metals and other basic materials will continue to be scarce for a long time after the war ends.

If you are going to need new dyeing and finishing equipment after the war, we earnestly recommend that you place your order with us *now*. Our "Post-war Purchase Plan" assures you prompt delivery when war restrictions are lifted. Write *now* for complete details of this plan.

There are still lots of business men who can't see the wisdom of making post-war plans *now*. We hear these men say, "I'll wait until the end of the war is in sight. That's time enough to make plans for peace-time business."

One of the fallacies of this reasoning is that *nobody* can predict when the war will end. It might come sooner than you think. And the manufacturer who lets peace catch him unprepared . . . who has made no plans to bring out new or improved products . . . to capture new markets or reestablish old ones . . . *to replace worn or obsolete equipment* . . . *to "put his house in order"* . . . will have a terrific handicap in the race for profitable business against farther-sighted, better-prepared competitors. May we suggest that you adopt this 3-point "peace program"?

SMITH, DRUM & CO. • Allegheny Ave. at 5th St., Phila., Pa.

SMITH-DRUM TEXTILE MACHINES

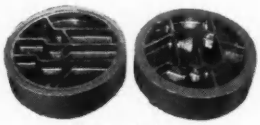
for hosiery dyeing, skein dyeing, package dyeing, beam dyeing, piece goods dyeing, package drying, skein mercerizing, warp mercerizing, hosiery inspection.

SMITH-DRUM MACHINES Have Always Been a Long Step Ahead . . . In Design, Performance and Sales

TECHNOLOGY DEPT.

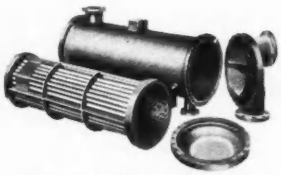
Porous Carbon Diffuser

Pipe, Fittings, Bubble Caps and Trays

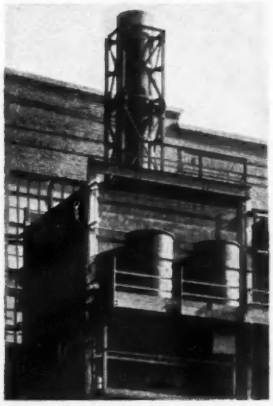


Headers for heat exchanger

Sections of segmental type reaction tower



Tube and shell heat exchange unit



47' high all-carbon electrostatic precipitator

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NATIONAL AND KARBATE CARBON AND GRAPHITE PRODUCTS
TRADE-MARK TRADE-MARK

are extremely versatile and readily adapted to the construction of equipment of conventional design as well as special equipment of new design.

Outstanding performance and economies, along with simplification of design, are made possible by the following unique and advantageous combination of physical and chemical properties offered by these materials.

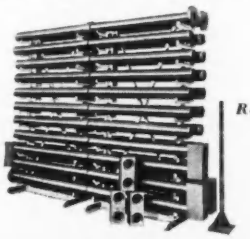
Resistance to severe thermal shock ⁄ No deformation at high temperatures ⁄ Not wet by molten metals – no sticking ⁄ Mechanical strength maintained at high temperatures ⁄ No reaction with most acids, alkalies and solvents — no contamination ⁄ High rate of heat transfer (Graphite and graphite base "Karbate" products) ⁄ Low rate of heat transfer (Carbon and carbon base "Karbate" products) ⁄ Low thermal expansion ⁄ Good electrical conductivity ⁄ Self-lubricating ⁄ Available in impervious grades ⁄ Available in highly permeable (porous carbon and graphite) grades ⁄ Easily machined and fabricated.

Practically any design can be machined or fabricated from available stock in the form of beams, blocks, slabs, brick, plates, round and rectangular rods, tubes and cylinders, pipe, fittings, valves, tower sections and tower accessories.

Special shapes or forms can be molded or extruded when quantity justifies.

The illustrations show only a few of the many diversified applications of these products.

Write for descriptive literature



Return bend cooling coil

NATIONAL CARBON COMPANY, INC.
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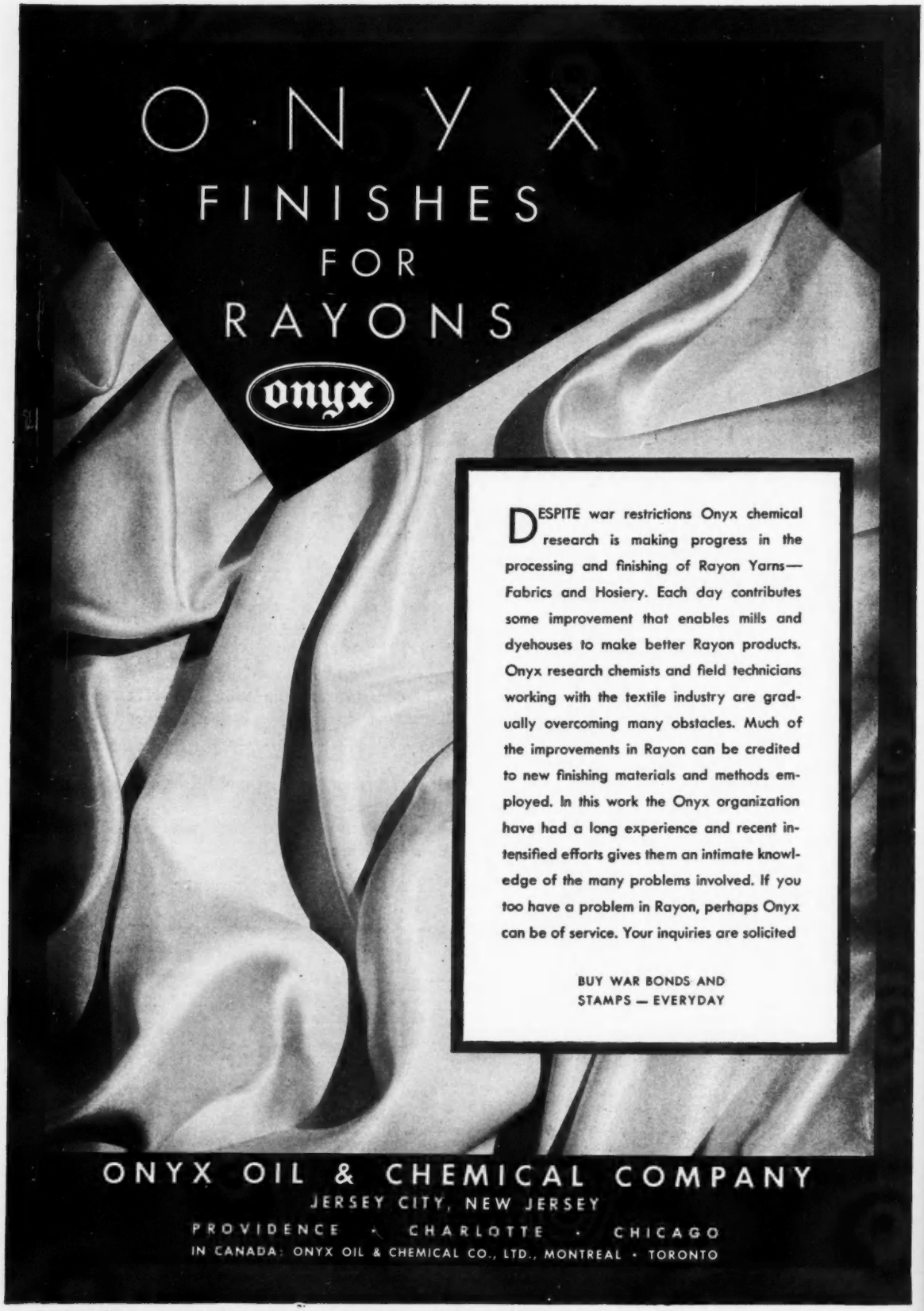
O·N Y X
FINISHES
FOR
RAYONS
onyx
DESPITE war restrictions Onyx chemical research is making progress in the processing and finishing of Rayon Yarns—Fabrics and Hosiery. Each day contributes some improvement that enables mills and dyehouses to make better Rayon products. Onyx research chemists and field technicians working with the textile industry are gradually overcoming many obstacles. Much of the improvements in Rayon can be credited to new finishing materials and methods employed. In this work the Onyx organization have had a long experience and recent intensified efforts gives them an intimate knowledge of the many problems involved. If you too have a problem in Rayon, perhaps Onyx can be of service. Your inquiries are solicited
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STAMPS — EVERYDAY
ONYX OIL & CHEMICAL COMPANY
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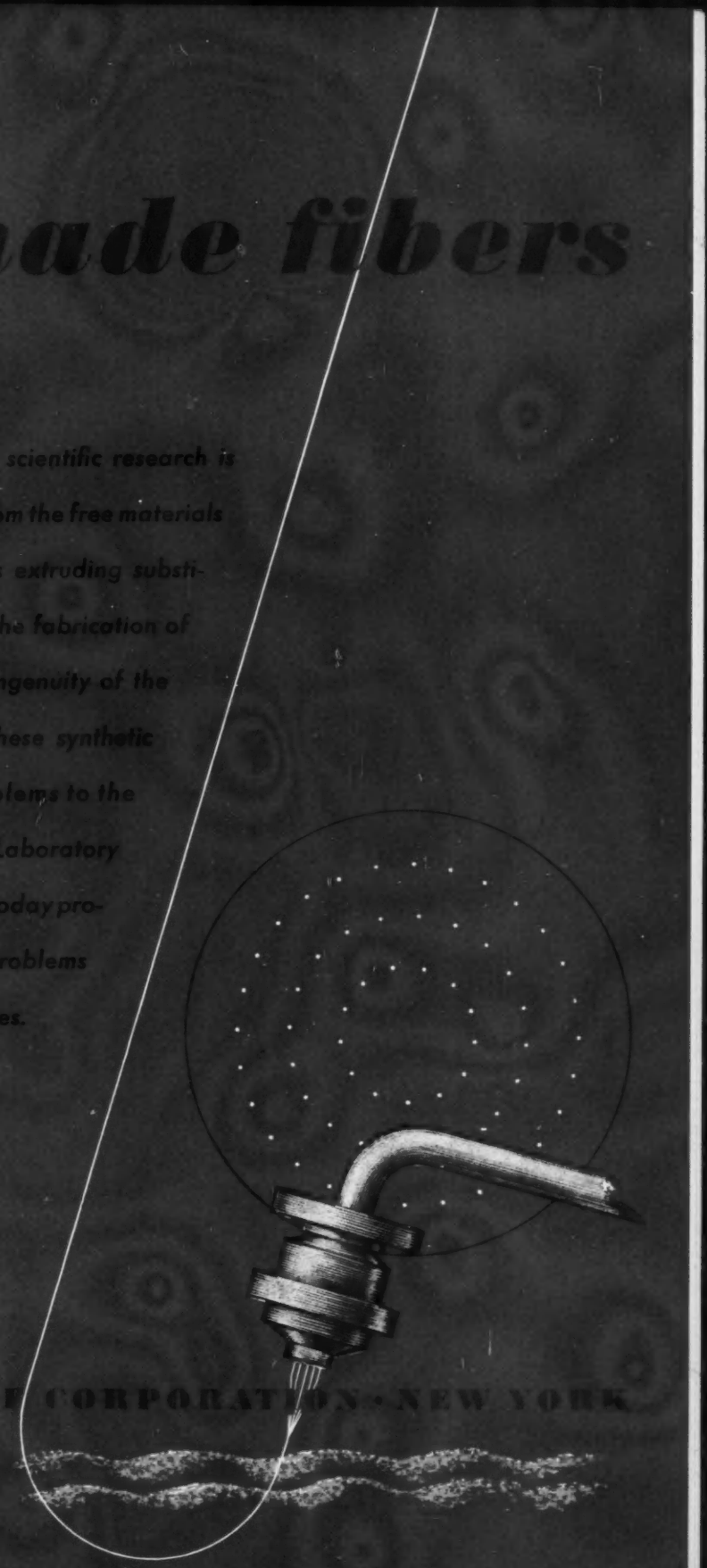
BACKGROUND IS ALL BEMBERG RAYON SATIN SHOWN IN COOPERATION WITH AMERICAN BEMBERG CORPORATION

man-made fibers

The accelerated tempo of modern scientific research is crowding discovery on discovery. From the free materials of nature the versatile spinneret is extruding substitutes for silk and cotton and wool. The fabrication of these fibers demands the utmost ingenuity of the textile mill. And the coloring of these synthetic fabrics presents formidable problems to the industry. The Technical Research Laboratory of General Dyestuff Corporation is today providing invaluable solutions to the problems of coloring these man-made miracles.



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Information for you, on

RED OIL ALLOCATION

1. Wartime production requirements have boosted the use of red oil (oleic acid) to an unprecedented level.

2. Like all other suppliers of red oil, Emery Industries has experienced an increase in demand beyond its capacity to supply.

3. To insure that red oil is made available on a fair basis to essential users, FDO 53 places this material on strict allocation. (Except for users of less than 2200 pounds per month.)

4. For anyone to buy red oil, he must file his order and Forms FDA 478 and FDA 477 with the Director of Food Distribution, U. S. Department of Agriculture, Washington, D. C. (This does not necessarily insure the filling of your requirements, but it is the only way in which your requirements can be met.)

LABORATORY-CONTROLLED THROUGHOUT PRODUCTION — EMERY INDUSTRIES INC.

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MAKERS OF STEARIC AND PALMITIC ACIDS, OLEIC ACID, FATTY ACID DERIVATIVES, TWITCHELL PRODUCTS, GLYCERINE, PITCH

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FOR FINER KHAKIS

USE THIS ALL-PURPOSE COMBINATION OF CHROME COLORS

METOMEGA CHROME BROWN RLL

METOMEGA CHROME YELLOW ME

OMEGA CHROME BLACK BLUE G

Imagine a combination of chrome colors that dyes *all* chrome methods... meets *all* fastness requirements... and dyes uniformly on *all* kinds of stock! Sounds almost too good to be true—but Sandoz has developed a group of three chrome colors that meets every requirement for top-grades of government khaki.

Here's an "O.D. combination" that dyes "tippy wool" level ...has excellent fastness to light, carbonizing and fulling for all manufacturing processes. What's more, it can be applied successfully to all types of fabrics. Write today for full details.

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SANDOZ CHEMICAL WORKS, INC., 61-63 Van Dam Street, New York, N. Y.

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IMPORTANT
ADVANCES IN

Water Repellent

TREATMENT OF

TEXTILES

TAM Zirconium Acetate, TAM Sodium Zirconium Acetate and TAM Zirconium Oxychloride are becoming highly important additions in the water repellent treatment of all types of textiles.

Results prove high repellence against hydrostatic and spray tests and good resistance to water washing. Tendering is practically eliminated and aging tests indicate prolonged water repellent life of your textiles.

An interesting report describing six methods of treatment has been prepared. We will be glad to send it to interested textile chemists.

TITANIUM
ALLOY MANUFACTURING COMPANY

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ZIRCONIUM TITANIUM
PRODUCTS

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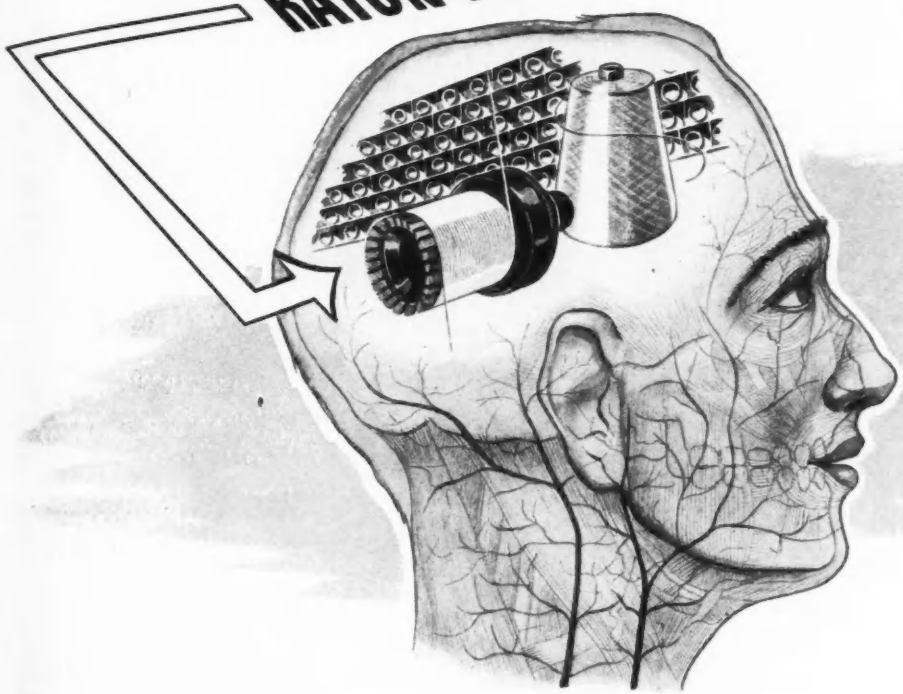
RAYON PROGRESS IS BORN HERE



It may seem a far cry from a piece of perfectly dyed cloth back to the mind of man. Yet, the cloth you can dye so evenly today owes its existence to the skill and vision of INDUSTRIAL'S technicians who "wouldn't leave well enough alone", and after years of experiment, perfected the "CONTINUOUS PROCESS"—an entirely new and revolutionary method of rayon production.

No longer a concept in a man's mind, today the "CONTINUOUS PROCESS" is very much a fact—and Industrial's great Painesville plant is turning out a yarn so uniform and knot-free that cloth woven from it has level dyeing characteristics never before available in rayon.

We're proud of what our men have achieved in giving the world the "CONTINUOUS PROCESS".

We're even prouder, that ours is still a Company of youth and vision and energy providing an atmosphere in which new ideas, new ways, new thinking, can grow in congenial soil and blossom into further textile progress.

Industrial
RAYON CORPORATION
MAKERS OF
CONTINUOUS PROCESS RAYON YARN
AND Spun-Lo KNIT UNDERWEAR CLOTH

*Reg. U. S. Pat. Off.

CLEVELAND, OHIO • *New York Office, 500 Fifth Ave.*

SYLVANIA

CEGLIN*

FINISH for TEXTILES

Sheeting treated with CEGLIN* acquires and retains a desirable "luxury" finish—and a "hand" that bespeaks quality. The use, too, of CEGLIN results in a lint-free product of increased strength and durability.

The proper application of this versatile cellulose treatment makes possible a broad variety of finishes for most fabrics that cannot be matched by any other product or method. CEGLIN* handles equally well with pigment dyes and water-repellent or mildew-proofing agents. It is resistant to repeated laundering and is economically applied, not only in the usual manner but also before kier-boiling. CEGLIN is the finish that "stays with" its product!

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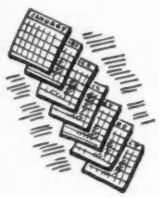
*TRADEMARK REG. U.S. PAT. OFF.

NEW METHOD FOR VAT DYEING RAYONS GETS THE "CROWN" TESTED GREEN LIGHT

No. 11 of a series—from our confidential files on the new "CROWN" Tested Plan

This story starts about 7 months ago. We were having breakfast with an executive of North Carolina Fabrics Corporation. Over the coffee we got on the subject of truly washable rayon fabrics. Our friend from North Carolina had been going over the CROWN Tested Plan handbook in detail . . . and his ultimate question was how his firm could best finish fabrics to meet requirements for the green light (go-ahead-and-wash-it) CROWN Tested tag.

Over and over the details we went . . . discussing and rediscussing ways and means of achieving the desired results. The gentleman from North Carolina agreed to try his hand at the job. For months on end we exchanged ideas, formulas, even routing methods . . . and after the hardest kind of sledding North Carolina has developed this new method of vat dyeing which, according to results achieved to date, is about as near to 100% fool-proof as any dyeing method could be.



Here are some of the advantages of this amazing new method which North Carolina is now identifying as "Vatru-Set"*.

It works equally well on such popular fabrics as rayon and wool gabardines, viscose fuji, viscose shantung and viscose and acetate challis types. It gives dependable results when you are working with difficult colors . . . the popular "ice cream" shades, and shirting shades in greens, blues and tans. The problem of acid and alkaline perspiration is licked. The CROWN Tested standards of washability at 160° F. and 40 hours in the Fade-Ometer are easily met. Furthermore, it leaves the character of the cloth completely unchanged. And to top everything, it provides definite shrinkage control in the finishing of the cloth.

We at American Viscose are proud of the results of this cooperation between North Carolina Fabrics Corporation and ourselves . . . and we think that the results provide another milestone in the perfection of American-made fabrics. Naturally we cannot reveal the details of North Carolina's new method of vat dyeing. We publish this story as one of the best examples of the value of working with the CROWN Tested Plan for the purpose of developing better fabrics for customer confidence.

There's Always Tomorrow . . .

And today the wise converters are looking toward it . . . when the seller's market will again become a buyer's market . . . when the business will go to the manufacturers with the most reliable fabrics.

So work now to perfect your cloth . . . to make it as right as it's possible to make it. Let the CROWN Tested Plan help you achieve the kind of fabric performance that means more sales. We'll gladly put our facilities to work for you . . . help solve any problem that arises in meeting the CROWN Tested requirements. Make sure of your share of tomorrow's business by selling fabrics tested and identified under the CROWN Tested Plan.

NEW INFORMATIVE LABELING

Consumer Satisfaction under the "Three Tag" System

"Crown" Tested
Reg. U. S. Pat. Off.
Rayon Fabrics

AMERICAN VISCOSE CORPORATION

Producers of CROWN *Rayon Yarns and Staple Fibers*

Sales Offices: 350 Fifth Avenue, New York City; Providence, R. I.; Charlotte, N. C.; Philadelphia, Pa.

*T. M. of the North Carolina Fabrics Corporation

Brightness and Economy are Characteristics of

Pharmasol Golden Yellow N

PHARMASOL Golden Yellow N produces clear, bright, fast and economical golden yellow shades when printed on cottons or rayons.

When mixed with Pharmasol Scarlet GNN, or Pharmasol Red GNN, a complete range of Tangerine and Gold Shades can be obtained.

Low cost Browns are obtained by mixing with either Pharmasol Blue GNXX or with Pharmasol Blue GDNN.

PHARMASOLS are solutions of stabilized azoic dyes and adjusted to the most practical concentration which can be easily applied with a maximum of efficiency.

PHARMASOLS solve the problem of troublesome dissolving and the uncertainties thereof—and as there is no decomposition there can be no loss of material or value.

Wide Range of use is Big Feature of

Indigosol Golden Yellow IGK

THE present price of Indigosol Golden Yellow IGK makes possible the use of this very fast Indigosol for economical dyeing and printing operations.

In combination with Indigosol Green IBA, very fast green shades are now available to the printer and dyer for the first time at a very reasonable cost.

An excellent printing color on cotton and rayon, it is also of great interest to the dyer of cotton, rayon and wool.

In ease of application, the perfectly level shades obtained, and the unusually excellent penetration of heavy goods makes the entire line of INDIGOSOLS especially valuable to the fast color dyer or printer.

CARBIC COLOR AND CHEMICAL CO., INC.

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AMERICAN DYESTUFF REPORTER

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JULY 19, 1943

VOLUME 32 NUMBER 15

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An Appeal For Advertising Support of the Year Book of the A.A.T.C.C.

Work on the preparation of the 1943 edition of the Year Book of the American Association of Textile Chemists & Colorists is now under way and it is hoped to publish the volume in the early fall. The sole income of this publication, from which the costs of production are met, comes from receipts for advertising therein.

Owing to very materially increased costs of production, the Association is faced with the likelihood of a deficit in meeting the expenses of this volume. Because of this condition and also because of the very real advertising opportunity it affords, this appeal is directed to all concerns which sell materials, services or equipment to the textile wet processing industry.

A great majority of the more than 700 pages which comprise this volume are devoted to technical information such as standard testing methods for various fastness requirements, lists of available dyestuffs and chemical specialties, etc. Because of this fact the volume is in almost daily use in every textile laboratory and dyehouse in the country.

This year more than ever before the volume will be in demand for constant reference by all mills operating on Government contracts because of the fact that the tests adopted by the Association have been accepted as standard by most Government purchasing depots.

In view of the above, it is obvious that an advertising message in its pages will reach those individuals chiefly concerned with the purchasing of textile chemical requirements for their respective mills, not only once but constantly throughout the year during which the volume is current, as a work of reference.

Should there by any profit from the publication, the surplus will be transferred to the Research Fund of the Association which is constantly handling projects vital to the industry as a whole.

The advertising rates, despite increased costs, remain unchanged at $75 per page and $40 per half page. The Howes Publishing Company acts as agents for the Association in the publication of the volume but has no share in its finances. Inquiries regarding advertising space should be directed to them at 440 Fourth Avenue, New York, 16, N.Y.

Very truly yours,

L. A. Olney.

L. A. Olney, Chairman
Year Book Committee

LAO:GB

PROCEEDINGS OF THE

American Association of Textile Chemists and Colorists

JULY 19, 1943

Officers of the Association

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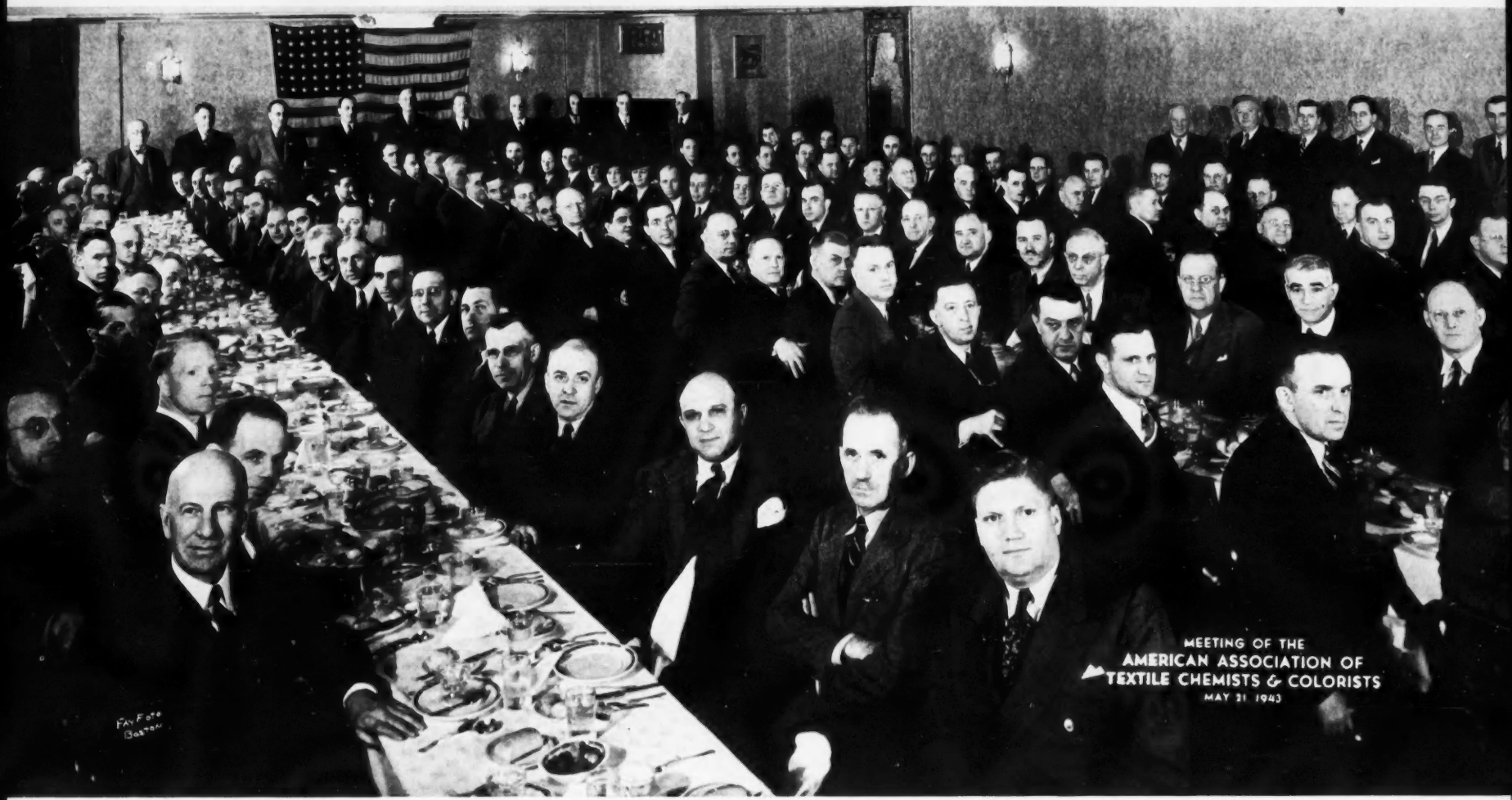
Members should notify the **Secretary** immediately of all address changes.

CALENDAR OF COMING EVENTS

Intersectional Contest, in Conjunction with New York Section Meeting, October 22, 1943.

Council Meeting, New York City, October 22, 1943



MEETING OF THE NORTHERN NEW ENGLAND SECTION, HOTEL MANGER, BOSTON, MASS., MAY 21, 1943

MEETINGS, NORTHERN NEW ENGLAND SECTION

March Meeting

THE fourth meeting of the 1942-3 Season was held at the Hotel Manger, Boston, Massachusetts, on Friday evening, March 12, 1943.

There were eighty-seven members and guests at the dinner, and, approximately one hundred and ten members were in attendance for the business and technical program which followed.

Chairman Edward S. Chapin presided over a brief business meeting at which he announced the program for the next meeting.

R. K. Jackson, Director of the Research Laboratory of Wesco Waterpaints, Inc., Boston, gave an interesting talk on "The Importance of Application of Infra-red Reflection in the Textile Industry." He also included a short discussion on fluorescent pigments which are being used extensively by the Army and the Marine Corps on fabrics.

F. D. Snyder, of the Westinghouse Electric & Manufacturing Co., spoke on "Infra-Red Drying Lamps," as used in the textile industry. Mr. Snyder described actual installations in textile plants and the value derived thereby, in the carbonizing, dyeing and drying of textile fabrics.

At the conclusion of the above two papers both speakers joined in answering questions of the members relative to their talks.

April Meeting

The fifth meeting was held at the Hotel Manger, Boston, Massachusetts, on Friday evening, April 9, 1943.

There was an attendance of ninety-four members and guests at the dinner, with a gathering of one hundred and thirty-six at the business and technical session which followed.

Chairman Edward S. Chapin presided, and at a brief business session announced the technical program for the May meeting. He also announced that due to war conditions the Annual Outing usually held in June would be omitted this year, and that the May meeting would be the final meeting of the season.

George O. Linberg, our Treasurer, presented a motion picture that showed, "Llama and its Habitat," produced by the W. R. Grace & Company. This film, in technicolor, very interestingly portrayed the ways of life of this animal which furnishes a very valuable fiber to the textile industry.

Dr. Laurence W. Bass, Director of the New England Industrial Research Foundation, Inc., a non-profit organization for the stimulation of industrial research, gave a talk on: "The Value of Research to the Textile Industry." Dr. Bass, long associated with various industries in a research capacity, told how research today is essential to the well-being of any industry and mapped out a typical research organization that the larger textile organizations should have. While Dr. Bass' research program seemed quite expensive, he very carefully explained how such an organization might justify its existence over a period of time.

At the close of this talk several members joined in a discussion of Dr. Bass' talk.

May Meeting

The sixth and final meeting was held at the Hotel Manger on Friday evening, May 21, 1943.

At this meeting there was an attendance of one hundred and thirty-seven at the dinner and approximately one hundred and firty members and guests at the business and technical program which followed immediately after.

Chairman Edward S. Chapin presided, and, at the business meeting called upon Clarence L. Nutting for a report from the Nominating Committee. Mr. Nutting then made the following report as to the nomination of officers for the coming 1943-4 season:

Edward S. Chapin, Chairman
Delbert E. Ray, Vice-Chairman
Azel W. Mack, Secretary
George O. Linberg, Treasurer

Sectional Committee

Joseph A. Bryant, Jr., Clifford G. Emmons, Tom Peel and J. Milton Washburn

National Councilors

J. N. Dalton, H. M. Hartnett and C. H. A. Schmitt

A motion was made and passed that the Secretary be instructed to cast one ballot in favor of the above nominees.

Chairman Chapin then introduced several visiting members from other Sections.

The technical program for the evening started off with Lieutenant-Commander D. W. Twigg, (S. C.) U. S. N., who told of: "U. S. Navy Requirements." Lieutenant-Commander Twigg quoted the specifications as set up by the Navy on its 16 oz. Melton, 11 oz. Flannel and Kersey Cloths and stated that there has been no change in these specifications. That is what the Navy would like, he stated, but, due to conditions, the Navy has been forced to accept fabrics manufactured in worsted mills and piece-dyed, without the use of indigo.

George O. Linberg, E. I. duPont de Nemours & Co., Inc., in cooperation with Fulton Rindge, Richard West and Joseph Charleton presented a paper on, "Continuous Indigo Dyeing."

Roland E. Derby, The Derby Co., spoke on, "Application of the Leuco Ester of Indigo."

Alan A. Claflin, A. A. Claflin Company, discoursed on, "Navy Blue with Chrome Colors, with and without Indigo."

Following the presentation of the above papers a question and answer period was held in which several members joined with the various speakers in ironing out problems connected with the dyeing of Indigo.

Respectfully submitted,
Azel W. Mack, *Secretary*

CONTINUOUS DYEING OF INDIGO*

GEO. O. LINBERG

E. I. du Pont de Nemours & Co., Inc.

IN A paper entitled, "Continuous Dyeing of Indigo on Woolen Piece Goods," read before the New York Section on December 5, 1942, and before the Providence Section on January 22, 1943, and published in the January 18, 1943, issue of the AMERICAN DYESTUFF REPORTER, a history was given of the development of the continuous Indigo piece goods dyeing machine.

In order that you might have a clearer understanding of subsequent developments, it might be well to review briefly some of the highlights of that paper and the discussions which followed its presentations.

It was pointed out that there was a definite relationship between the concentration of the Indigo in the dye bath and the time of immersion to produce heavy shades. It was found further that it would be necessary to use concentrations considerably higher than those regularly used in previous Indigo dyeing methods. At the present time, this concentration is 4½ ounces of Indigo per gallon. Early in the development work, it was evident that to obtain a good depth of shade, it was necessary to have a chemical in the dye bath that would insure almost instantaneous wetting of the fibers.

It was disclosed that the continuous piece goods dyeing machine operates at a speed of 12½ yards per minute and the cloth to be dyed is immersed in the dye liquor for a total of 6 minutes. This immersion is carried out in two equal periods of 3 minutes each. Following the first immersion, the cloth is nipped and then carried to the skying frame for a 5-minute oxidation. It is then passed through the same bath again for a like period, nipped, skyed, and plaited on trucks. It was found that the first 3-minute dip produced a shade approximately 30 per cent of the final shade, even though the second dip was of the same duration. This indicates rather definitely that Indigo acts as a mordant for itself.

In our search of the literature on dyeing, we have found an old volume that substantiates this statement. This book is entitled, "The Best System of Dyeing Woolen, Cotton and Silk of All Colors, Practised and Recommended by the First Artists of Europe and America," published 1811 in Bennington, Vermont. Quotation—

> "The advantage of dyeing all your wool or cloth at one time is having it uniform. At the end of 3 hours the vat would still be warm so that after stirring and letting it settle for 2 hours, the wool may be dipped again.
>
> By this means the color is heightened almost as much more, because wool once dyed with Indigo always takes a much better color than new or white wool, though suffered to remain in the vat for 20 hours."

The fundamental design of the continuous Indigo dyeing machine involves the use of a 3000-gallon dye bath tank equipped with two 500-gallon feed tanks used alternately to maintain a constant level in the dye bath. Each of the replenished tanks contains enough vatted Indigo to dye approximately 3000 yards.

It is evident from the formula outlined in the AMERICAN DYESTUFF REPORTER that the desired Navy shade was obtained by the use of Indigo alone.

The large volume in the dye bath in relation to the amount of cloth contained therein at any given time means that a relatively small percentage of the total Indigo contained in the dye bath is removed by each piece. This has been calculated to be slightly more than 1 per cent of the total Indigo in the dye bath. Hence, shortly after the start of a run, the feed tank is turned on and this feed replaces uniformly the amount of Indigo that is removed by the cloth and also that very small amount which is squeezed out by the larger nip rolls and discarded at that point. By this method of feeding, the percentage of color in the dye bath cannot vary much at any time so the uniformity must be constant—with all other conditions being constant.

It goes without saying that the addition of various chemicals such as Hydrosulfite, Caustic Soda, Glue, etc. must be carefully balanced in the feed vat so that they replace at a constant rate those materials that are being used up in the dyeing process. This form of control in all types of continuous dyeing is normal dyehouse procedure and once established, few changes—if any—have to be made.

The primary charge of the dye tank and the various feed formulas have also been published in detail in the AMERICAN DYESTUFF REPORTER. A heavy even set of the squeeze rolls at the point where the goods leave the bath is an essential feature of this process since the removal of surplus unfixed Indigo simplifies the subsequent scouring operation. The goods are scoured in the usual manner, preferably in a Dolly washer.

The outstanding feature of this entire process is its simplicity.

Since the installation of the first continuous Indigo dye-

*Presented at meeting, Northern New England Section, May 21, 1943.

ing machine at the Hampshire Woolen Company in Ware, Massachusetts, well over a million yards of the 11-ounce flannel have been processed and have been found highly satisfactory by the Naval Clothing Depot in Brooklyn, New York.

Since the publication of the first paper on this subject, the Navy has expresed a desire that their woolen fabrics, such as the flannel, Melton and Kersey manufactured for them contain a definite amount of Indigo in one form or another.

There were but a few mills which were available to process these fabrics from Indigo dyed raw stock. In order to meet this increased demand, experiments were carried out further with open width equipment in various mills to produce an Indigo bottom uniformly and quickly in the piece which could then be topped with chrome colors in a kettle to achieve the shade desired by the Navy. It was not always easy to find equipment in the average mill which would permit demonstrations to be run in the open width, but in several instances, either carbonizing units which were not in use at the moment or various types of crabs and other miscellaneous equipment were located.

An Indigo bottom of accepted depth is obtained in less than two minutes on all three fabrics in the open width. After fulling and scouring the shade is approximately a 10 per cent shade of Indigo paste. The flannels can be dyed at any stage of manufacture, either fulled or unfulled. With Meltons and Kerseys it is best to full and scour after applying the bottom to remove the excess Indigo. The short immersion period and the fact that a skying frame is not necessary for this process indicates that an elaborate machine is not required.

In this bottom shade, the concentration of about 4½ ounces per gallon is again used and the liquor volume ranges between 600 and 1200 gallons. The size of the dye bath depends first upon the equipment used and secondly on the speed at which the mill desires to run. At a number of mills at the present time, this shade is obtained in 1½ minutes immersion in the dye bath and at a running speed of 12 to 25 yards per minute depending upon the size of the unit. After nipping, the goods are then vacuum extracted, wherever possible to aid oxidation and then plaited on to a truck. They are then fulled and scoured and are ready for top chroming.

In dyeing the materials in the unfulled width, which are scoured lightly before dyeing, either in a continuous washer or in the regular scouring equipment, sufficient penetration of the Indigo is obtained so that any minor faults in the heavier fabrics are well covered by the subsequent chrome dyeing. This method is practical and speedy and results in better and stronger fabrics with a fine hand.

At this point, a note of caution is in order regarding the chrome dyeing procedure. Care should be taken in topping the Indigo bottom to prevent two-sidedness. It has been observed that goods bottomed with Indigo are more receptive or substantive to chrome colors used in the topping operation. It is therefore recommended that the additions of acid and the period of time in which the kettle is brought to the boil be carefully controlled.

In mills where there is no open width equipment available, and where the daily production is relatively small, it is posible to apply the Indigo bottom in piece goods in the conventional piece dye kettle. In this case, the goods can be fulled and scoured and even carbonized and neutralized before the dyeing operation. It is important to know the exact volumetric content of the kettle to be used since here again the concentration of the Indigo in a given volume has a definite bearing on the depth of shade.

After the goods have been sewed into the kettle, they are run into a spring bath containing Soda Ash, Hydrosulfite and Animal Glue. After the goods have ben run in this spring bath for 15 minutes at 130° F., the vatted Indigo is then added to the bath and the goods are run for 10 minutes. Since in this method the goods leave the bath and go over the reel, exposing the reduced vat to the air, it is necessary to make further additions of Hydrosulfite. These additions of Hydrosulfite of Soda to the bath not only help to keep a well reduced vat but lowers the pH of the dye bath, which in turn helps the transfer of the vatted Indigo from the bath to the goods in a relatively even and uniform manner. At the beginning of the dyeing operation and after the vatted Indigo has been added, the pH of the bath is between 10½ and 11. As the dyeing proceeds, the pH is gradually reduced by the oxidation products of Hydrosulfite until a pH of 8 is reached. At this point, the bath is overflowed to remove the accumulated foam or scum and the rinsing is continued for an additional 45 minutes. When the goods are rinsed clear, they are slightly acidified and are then ready for top chroming. It is important in kettle dyeing of woolens or worsteds that the reel of the machine be as near the dye bath as possible to prevent excessive oxidation.

In the dyeing of Kerseys, it is best to bottom them with Indigo in the unfulled state. In other words, after the goods have been mended and inspected from the loom, they are given a slight scouring in the dye kettle and then bottomed with Indigo. They are then removed from the kettle and go through the usual fulling and scouring before top chroming.

The simplicity of the continuous Indigo dyeing method encouraged us to extend this process to the dyeing of raw stock. This was accomplished by the use of a continuous wool washer, and here again, the full shade was obtained with Indigo alone. The concentration of Indigo per gallon is practically the same as that employed in the continuous piece dyeing machine and the formula for the feed is the same in most of the essential details. This process leaves the wool in a much better condition for subsequent carding, spinning and weaving than is usually obtained with wool

that has first been bottomed with chrome colors and then topped with Indigo by the various methods of dyeing now in force. As a matter of fact, the loom efficiency approaches that of white wool.

We have described briefly several processes of continuous Indigo dyeing to produce the full Navy shade on both piece goods and raw stock as well as the Indigo bottom for the Indigo-Chrome color combination.

We are dedicated to the task of developing practical continuous dyeing operations on all types of fibers and fabrics. Our progress to date confirms the fact that the woolen fibers dyed in the interval of minutes rather than hours causes less degradation of the fiber and results in fabrics of greater strength, better hand and superior quality.

Piece Goods Dyeing with

LEUCO ESTER OF INDIGO*

ROLAND E. DERBY

The Derby Co.

I am very pleased to have the opportunity of speaking before my home section on the subject of piece dyeing with the Leuco Esters.

As you all know, I spoke before the New York Section on this subject in December and all of that information has been published and probably most of you who are interested in the subject have read the discussions at that time.

Very briefly I will outline the important points of that paper and offer any further suggestions as I go along. In the manufacture of the Algosol Blue, I believe the information given covered that pretty thoroughly and I will not go into that detail again. The main point being that the manufacture of Algosol started with Indigo and the application of Algosol finished with Indigo, therefore establishing the fact that we had Indigo on the fabric after dyeing.

It was pointed out in the December paper that the Navy has upheld its Indigo for a great many years until it has become a tradition with them. I stated at that time I believed they were 100 per cent right, for two reasons. In the first place, they obtained uniformity by establishing their dye formula. In the second place the fastness of Indigo could not be questioned. In this latter statement I will not attempt to change the fact that I still believe they were right in demanding Indigo dyed material but nevertheless it is possible to set up a series of tests which would put Indigo on the low side as compared with Chrome-Dyed material, if we included in those tests some of the problems which have been brought about in the present war developments.

One of these is the fastness to crocking. The very extreme scouring required with Indigo as compared to Chrome Colors would show up Indigo at a disadvantage, particularly in those mills where washers are the bottleneck. Another test which has been recently applied is the sublimation of Indigo when the goods are subjected to very hot ironing. This has been brought about by complaints of the sailors that their white stripes in their collars had turned to a rather bad looking pale blue shade. As far as I know all Indigo dyed material is subject to this hotpressing if the iron is used too hot. Chrome colors, of course, do not show this fault. Third, there is the cost proposition in which the Chrome Colors can show up at a great advantage, probably at least ½ the cost of dyeing Indigo without considering at all the saving in time required. However, the fastness requirement in all other respects of Indigo still must remain unquestioned and I still believe the Navy's demand for Indigo is more or less well founded.

One of the chief reasons why Indigo is so important to the Navy is in the shade itself. Indigo presents a shade which after several years of trial and experiment and observation of other people's work, I feel pretty safe in saying, can not be matched with any Chrome-Dyed materials available. This difference has shown up best by observing carefully the over-hand appearance under incandescent light. If the daylight shade of Indigo is matched with Chrome Colors, the over-hand appearance in artificial light will always be very plummy or red. Now it might easily be said, what is the objection to this? What interest is there in the over-hand appearanc in artificial light? To all those dyers who have had experience in matching under very wide range of daylight

*Presented at meeting, Northern New England Section, May 21, 1943.

during sunlight, at all times of day and north light under different sky conditions, this can be readily understood because this same effect of incandescent light can be produced or very nearly produced under several conditions of daylight. You may pass a Chrome Dyed shade at one time and then look at the over-hand under other conditions of daylight and wonder how you could have ever passed it.

Furthermore, if Chrome Dyed materials were to be accepted by the Navy it would be very important and I wish to express this point more than anything else I can say, that the Navy establish a Chrome Dyed formula so that they will get uniformity of delivery. If all mills are allowed to use their own judgment and every one uses different combinations in an attempt to obtain the result, the Navy will find themselves in the same predicament that the Army has found themselves in a very great variation of shade in deliveries.

Now all this discussion has very little to do with the application of Algosol Blue or the dyeing of Navy shade by the application of Algosol Blue and topping with Chrome Colors. A great many of you present here tonight have had experience in the production of Navy Blue shades with Algosol Blue. It doesn't seem necessary to go into much detail about its application. The application was covered quite thoroughly in my previous paper but there are a few facts regarding its application which may be helpful.

To begin with, most of the work has been done on carbonized goods and for this application most of it started out by using some acid in the dye bath with the Algosol together with the acid left in the goods after carbonizing. I have several tests here to show that this is unnecessary. The acid in the goods after carbonizing is sufficient to exhaust the bath thoroughly and generally speaking most of the mills have eliminated the use of this acid for this purpose. The boiling time with the Algosol ranges from 45 minutes to one hour. In the Algosol dye bath we also find that ½ per cent of hydrosulfite is sufficient to keep down the oxidation during the dyeing process. This aids in the effect on the wool fibers.

We then proceed with the nitration which usually requires about one hour-running cold. In the nitration, we have found that instead of 2 per cent of Nitrite of Soda, 1.25 per cent to 1.5 per cent is sufficient, and the sulfuric acid used varies somewhat depending on the number of pieces dyed. On full dips, 10 per cent of sulfuric acid seems to be sufficient. After running an hour, the goods are washed and neutralized. The best way to neutralize these pieces is with Soda Ash and we find that 8 per cent to 8.5 per cent soda usually neutralizes the pieces quite thoroughly. It is not necessary, after this soda ash treatment which requires about 20 minutes, to wash before proceeding with the dyeing. The Chrome Colors can be added and the ammonium acetate and Glauber salts can be added directly to this bath. We then take from 45 minutes to 1½ hours coming up to the boil. This wide variation in time is due to the difference in the type of wool dyed and the type of fabric being dyed. In some instances, 45 minutes has been sufficient, but in other instances we find that we get shady goods and very bad back and face differences if we do not take at least 1½ hours in bringing this top dyeing operation to the boil. The boiling time is usually 45 minutes to an hour, during which time two additions of acetic acid are made to exhaust the bath. The goods are then top chromed in the usual manner, and we have found no need of cooling back with cold water before the chroming; Bring back to the boil and boil 45 minutes.

In the dye bath and in the Algosol bath, we have found a great advantage in the use of fatty alcohols or similar compounds. One per cent on the weight of the goods in both cases will reduce very materially the crocking on the finished goods, so much so, that there seems to be no need of any subsequent scouring operation.

I will not go into the application of Algosol on raw stock as this is very easily carried out and the results are very satisfactory in any pressure type of machine.

Now as to the top chrome formulas—In my previous paper I mentioned two top chrome formulas. Both of these have been changed materially since that time in practical use but Formula No. 1 in which we used Sulphon Cyanine and Erio Chrome Red B seems to be adopted in the greatest number of cases. We have eliminated Alizarine Blue Black from the formula in order to obtain better shade matches and also because we have found that by dyeing the formula top-chrome, our fastness results are greatly improved. The formula as it now stands generally averages about 3¼ per cent of Erio Chrome Red B and 1¼ per cent of Sulphon Cyanine. This, of course, varies a little with the type of stock and whether the Kersey shade is being matched or the Melton is being matched. For the Kersey, this formula is usually increased about 15 per cent. In regard to Formula No. 2, mentioned in my previous paper, in which Acid Chrome Blue 2RA was used, I still believe that this formula would give us very much better fastness. In fact, mill trials have proven this and several mills are now operating using the Acid Chrome Blue 2RA shaded with other dyestuffs as a top-chrome formula and other fastness tests are definitely better. However, their shade is not as good and it can not match exactly the Navy shade, particularly in over-hand under artificial light.

This seems to cover fairly well the present methods of application now in use but I think the best information I can give you would be to discuss some of the problems which have risen in practice.

The first problem, of course, has been crocking. But as I have just stated, this is very well taken care of by the addition of fatty alcohols to both the Algosol and the Chrome-Dye bath; although it can be made very bad if too much acid is used in the top-chrome dyeing or if the

dyeing is carried out too rapidly. The application of the top-dye formula by the top-chrome method has been responsible for elimination of any crocking trouble to all practical purposes.

The second serious trouble is the difference in back and face on piece-dyed Navy shades. This, of course, has one source and that is due to the fact that it is necessary to tack the goods for the dyeing operation. I am now referring to the 16 oz. Melton. The 30 ounce Kersey has no difficulty whatever with back and face trouble as it is unnecessary to tack the goods for either fulling or dyeing but due to the construction of the 16 ounce Melton which is a three harness twill, these goods roll very badly in rope form and if dyed without tacking, the selvedges would roll in very tightly and it would be impossible to penetrate this tightly rolled material. Therefore, due to the weave and construction only of these fabrics, it is necessary to have the goods tacked both for fulling and for dyeing. Personally, I feel that if piece-dyed material is to be used by the Navy that an investigation of the construction of the 16 oz. Melton could be very well carried out and another be adopted which would not give us this difficulty. However, the difficulty is present and we must find a way to obtain the best results possible.

I have never seen a Navy shade dyed in the tacked condition which did not show some difference back and face. There are a few precautions which will help this situation and produce quite satisfactory results. In the first place, slowing down of the dyeing operation helps a lot, but more than this a very loose tacking or opening of tacking from three or four yards allows the dye liquor to circulate better in the inside of the tube and the difference is very much less pronounced. The trouble as a whole, however, still exists and as far as I know no other means have been found to eliminate it.

The third problem, and one of the most serious problems we have had to contend with, is strength. These fabrics have a relatively high strength requirement. Although it has been lowered from previous specifications, it still requires the best wool procurable and the best means of operation known to produce satisfactory strengths. This problem has been very seriously handicapped in the dyeing operation and at first we felt that Algosol Blue and the top dye method had a very serious objection. We found that the goods tested after carbonizing and before dyeing lost, during the dyeing operation, approximately 25 per cent in strength. Now that is a very serious loss when you need all the strength possible and there have been many claims on the goods produced by this method because they did not meet strength specifications. The outline of the formula of dyeing which I have just given you has helped somewhat in this strength loss but it has not solved the problem.

Out of curiosity, we have tried the strength on the same material dyed with Chrome Colors only, thinking that the short dyeing process might save the strength and that the long dyeing process was the cause of its loss. To our surprise, the loss in strength, dyed with ordinary top-chrome dyestuffs was just as bad as the entire process with the Algosol. Many things were tried to save this strength and only one has shown a real answer to the problem.

We dyed the 30 ounce Melton before carbonizing and carried out the carbonizing process after dyeing and much to our surprise, our loss in strength was practically eliminated. These goods showed less than 10 per cent average loss in strength in the warp and less than 5 per cent average loss in strength in the filling. It would seem, therefore that carbonizing the goods after dyeing would solve this problem. Our strength tests in this case were way above the necessary specifications and although comparatively little work has been carried out this way, we feel rather certain that it is the answer to our problem. Now what the cause of this is I will leave to your own theories as I have nothing but theory to offer but apparently there is some change in our wool fiber during our carbonizing process that makes it more sensitive to boiling operations than on wool which has not been carbonized.

I think this could be upheld by some of the past experiments carried out in carbonizing in which we show a definite change in the wool fiber. However, there is another point which may have some bearing on it. We had an occasion to dye some Algosol Blue for a much lighter shade of Blue in which we used the regular 5 per cent Algosol Blue base but in the top chrome dyeing, we used very much less color, somewhere in the neighborhood of ½ per cent in total. On this work, our strength loss was only about 12 per cent in the warp and about 10 per cent in the filling. This would indicate that the amount of dyestuff used in obtaining this very heavy Navy shade also has some bearing on our strengths, particularly on the goods carbonized before dyeing.

This also checks with the results we have noticed for years in women's wear piece dyeing that the strengths of our heavy shades, dark browns, greens, navy blues and blacks were always much less than the same cloths dyed into pastel shades. I have no theory to offer on this and it is possible that it may be a very intricate matter.

This covers for the most part all of the serious troubles we have run into. The mills all over the country have now had a great deal of experience in dyeing the Navy shade by this method. In fact, we believe from all the statistics available that there has been approximately three million pounds of Navy shade produced in this manner. In general the results have been quite satisfactory and it has presented a new means of obtaining the desired results for the Navy. I think also that it has been the instigator of a great many experiments which have also been quite satisfactory.

As you all know, and have been told, Indigo is being applied in the piece dye kettle and as I understand from

various sources with very satisfactory results. Certainly all these experiments have been worth while. They have brought about a generally better understanding of Indigo application and while I believe the Navy could meet all of their requirements for fastness without any exception by the use of Chrome colors, the true Navy shade and the importance of uniformity are the main reasons for use of Algosol or Indigo in its various methods of application.

In my work around the various mills in the application of this method, I have found extreme cooperation and extreme interest. At this time I would like to take the opportunity of thanking all those with whom I have worked for this cooperation and I take considerable satisfaction with them in the results which we have obtained.

Navy Blue with or without INDIGO*

ALAN A. CLAFLIN

A. A. Claflin Co.

IF IT were possible to set us all back fifty years, we in this room would find at least one-half of our professional time was taken up by problems connected with the evaluation and application of a single dyestuff, viz: INDIGO.

Few people now appreciate what an important part Indigo then played in the dyer's art or textile chemist's profession. Every mill of any size had a blue dyehouse as well as a fancy dyehouse, and frequently the tonnage of the blue dyehouse far exceeded that of the fancy dyehouse. The reason for the importance of Indigo was its fastness both to light and other influences. The invention of synthetic Indigo took away from the chemist the necessity of ascertaining whether the last lot of Bengal, Java and even Guatemala Indigo was up to sample or an importer's description or guarantee, but the introduction of the even faster vat colors, which quickly followed the synthetic production of Indigo, to some extent lessened the relative importance of Indigo to the cotton dyer, although still very large amounts of Indigo are used for dyeing denims and chambrays. In woolen dyeing the importance of Indigo has been lessened by the development of various fast chrome dyestuffs because these colors have a wide range in the spectrum. The wearer of woolen fabrics, who desires a fast color, is no longer confined to blue or black, so we find it is no longer essential to depend on a blue serge or unfinished worsted for standard business wear. Nearly everybody still has, however, one navy blue suit, and the vast majority of uniforms, e. g., policemen, railway train men, street car men and firemen are navy blue. In the course of time the use of Indigo in producing these navy blues has steadily decreased, so much so that at the beginning of this war less than 5 per cent of all the navy blue produced for men's wear was dyed with any indigo. What little indigo was used in woolen and worsted fabrics was practically all confined to goods for the government, particularly for the navy. The Navy in its specifications for its woolen goods, whether they be Kersey, Melton or Flannel, provides they shall be stock bottomed with alizarine on a chrome mordant and then dyed with indigo. This specification has the date line of the last decade of the nineteenth century imprinted on it. Previous to that time there was very little dyeing of any sort with a chrome mordant and later than that period alizarine without specification did not necessarily mean alizarine red.

When the demand for navy goods became so great that it was evident the facilities for producing these goods according to this navy specification were nowhere near adequate the bars were let down to quite an extent and the Navy had to take what it could get. In general, however, it has still stuck to indigo. Now in the papers tonight we have an example of goods dyed for the navy not stock dyed, but piece dyed,—one processed with straight indigo and the other with a leuco-ester, which is subsequently topped with chrome colors. What the Navy really wishes of course is the navy blue which will be most resistant to all adverse influences. Thus the question arises whether the Navy, which still requires indigo, is more nearly correct or civilian demand, which in the last forty years, and particularly the last thirty, has replaced indigo as an entire or partial constituent of what we shall probably always call "navy blue."

While indigo has always been a good dye for cotton, it has never been an entirely satisfactory dye for wool, because the reduced or leuco form of indigo was only soluble in alkaline solutions and alkaline solutions are incompatible with wool. Thanks to Dr. Harris, we know they attack the cystine linkages. As a dye, indigo has little substantivity towards wool. What one does when one dyes wool with indigo is to merely precipitate an

*Presented at meeting, Northern New England Section, May 21, 1943.

insoluble pigment on the wool. Because it is a pigment it is surprisingly fast to light but correspondingly it is only fast to washing because of its fineness, and, there is much waste of dyestuff due to the formation of the insoluble pigments which are not on the fiber. Nevertheless there has arisen a certain myth as to the fastness of indigo to all influences. One particular reason for it is that the first blues for wool that were substituted for indigo were largely logwood blues, which are not fast to light. When these were replaced with the nitro anthraquinones or alizarine blues, the greater cheapness of logwood still made it very tempting to use too much logwood and too little alizarine blue. It was the introduction of the chrome azo colors of the Eriochrome blue black type, combinations of 1-2-4 acid with beta and alpha naphthol and the chromotropes or oxidized fuchsines, that really completed the replacement of indigo for civilian purposes. These latter are not fast to fulling and therefore not suitable for woolen goods, and perhaps the chrome blue blacks are by themselves more of a plum shade than a blue, but in combination with the various blues that are available from the nitrated anthraquinones, it is entirely possible to produce a blue color which is as resistant as the fabric itself.

So far we have discussed production of navy or deep blue without the use of indigo, i.e., with chrome colors replacing indigo. Now we may speak of chrome colors used in combination with indigo. The navy specifications speak of bottoming with alizarine. This is an amendment to the art of dyeing which came into being in the late 80's and early 90's of the last century. First barwood and then alizarine was used, and they were used to brighten the color of indigo-dyed shoddys. At that time the art of stripping shoddy was not as well understood as it is today and reworked wool was a deep grey. It was found that this greyness could be overcome in a large degree by dyeing with a blueish red shade. As stated, barwood was first used and then with the introduction of a chrome mordant, Alizarine Red was used. When this was topped in an indigo vat the result was a deep shade of blue of somewhat reddish cast which is more in accord with our present ideas of what is a "navy blue."

The original navy blue based on the riding habit of the Duchess of Bedford and then immortalized by Lord Nelson and the other admirals of the Napoleonic Era, was a much lighter and brighter blue than we consider a navy blue today. In fact it is extremely wasteful to produce as deep a shade as the navy specifies today with indigo alone. With the red bottom this can be done and while the red was first used on shoddy, it afterward became standard practice for all deep navy blues. One reason for this is that the synthetic indigos do not carry the indigo red which occurred naturally in many of the plantation indigos, particularly the Java indigos. While alizarine red, hydroxy anthraquinone, is specified by the navy and still is fairly largely used, there is probably much more of Eriochrome Red B or Red ECB. This red made from 1-2-4 acid and pyrazalone, is considerably cheaper than the alizarine red and stands carbonizing better. In addition to these red colors and an occasional fast chrome bordeux, in order to get more color and use less indigo, it is usually customary to assist the indigo with Alizarine Blue Black B or with an Eriochrome Blue Black B. Sometimes a small amount of Sulphon Cyanine is used and at other times some of the special bright blues which are made of substituted nitro anthraquinone. In general, when using these black or blue black mixtures with indigo it is better to put the indigo on first and top with a chrome color. This again is contrary to specification, but has certain advantages. By using a true dyestuff, that is, a product with high substantivity towards wool, colors can be matched and a uniform color obtained. When a pigment is precipitated, uniform results are best obtained by the continuous dyeing or law of probability method. It is not to be assumed, however, that putting the chrome color on top does not have disadvantages. It does, because when there are specks of unattached indigo in the fabric, these specks in turn become dyed and intensify the tendency to crock, which is always present when any indigo is used. With the leuco-ester method of dyeing, the topping with chrome colors gives probably better results than with a vat-dyed indigo as one is not changing from an alkaline-dyed to an acid-dyed fabric, but there is also a tendency to use less and less of the indigo ester and approach more and more to a straight chrome dyed fabric. In fact at times one approaches the rabbit sausage of the last war which was one-half rabbit and one-half horse, with the indigo taking the place of the rabbit and the chrome dye that of the horse, except in the case of the sausage I do not know that it was recorded that the smaller the rabbit and bigger the horse, the better was the sausage.

Discussion

FOLLOWING PRESENTATION OF PRECEDING PAPERS PRESENTED AT N.N.E. SECTION MEETING, MAY 21, 1943

Edward S. Chapin, Chairman, Presiding

Mr. Christison: One of the most interesting points brought up this evening is the question of strength and the effect of chrome dyes on the strength of wool. I would like to ask Mr. Derby if the carbonizing acid was allowed to remain in the goods or if the goods were tested in the acid rather than the alkaline state, when the superior strength was noted.

It is my impression that some of the European governments recognize this phenomena because some of the mill men were smart enough to give a little more strength to the goods than they would naturally have and there is some evidence to support the idea that the goods containing the carbonizing acid are apparently stronger than they are after the acid has been removed.

Mr. Derby: That question was very well put. On the thirty ounce kersey we made tests on the goods after fulling and scouring, but before carbonizing, and our strength tests on an average of twenty pieces was 132 pounds.

The same goods, after carbonizing and before dyeing, tested 141 pounds in the acid and that followed uniformly about the same throughout the whole twenty pieces.

These same goods, however, lost twenty-five per cent and that twenty-five per cent is based on 132, not 141, after the dyeing process. Now, the strength tests which I cited in the carbonizing after dyeing were tested before dyeing and after fulling just the same, only in this instance we had a napping operation in order to get the proper finish, and our strength test was about 110 pounds.

After carbonizing, the strength test was 105 pounds and after dyeing, the strength test was 105 pounds on the finished goods which had been neutralized after carbonizing with water only, not with alkali.

They had been run in the washer for a period of forty-five minutes with warm water or half an hour with warm water and fifteen minutes with cold water which was the same neutralizing process we had used before.

There is certainly plenty of evidence to support Mr. Christison's statement that the goods in the acid show an increase in strength. I think that if the acid is carefully washed out of the goods the increase in strength is lost.

Mr. Christison: Mr. Derby, I think we all admit that perhaps the expression of neutralizing with water is more or less a joke. It simply can't be done. The goods that are so called—neutralized—contain perhaps one to two per cent of acid and it is my opinion that if that acid is really neutralized that the goods will revert to the strength that you get on goods that are carbonized before dyeing.

Mr. Derby: You may be right. That has not been tried out. I think it would be very doubtful if we would lose all of that strength, twenty per cent or more, by simply neutralizing that acid. That seems to be somewhat beside the question because the goods are quite satisfactory even if they are rinsed with water as far as use is concerned and, certainly if it meets the strength requirements necessary, that would solve one of our problems.

Mr. Deady: I think we were all a little surprised as to what you said about chrome colors. How about chrome colors on woolens? Could you go into that more?

Mr. Derby: Frankly, I can't answer that as far as chrome colors are concerned because most generally our chrome color work has been on worsteds where the strength has been quite satisfactory.

On acid color work on woolens the same phenomena has occurred, particularly on fabrics which are perhaps on the border line for strength. We have the greatest difficulty with blacks, and next along the line are the next darker shades; pastel shades would be right up there in strength. I could say the same thing for Neolans—that we have had similar problems with the darker shades where the strength was perhaps slightly lacking in the original fabric.

Mr. von Bergen: In regard to the strength question—many of us never knew what it meant until we came to a large Army and Navy contract and were able to test hundreds of pieces in the mill.

Per example, fulling is the operation where you expect the main strength increase and take it for granted that white goods show a higher strength increase than wool dyed. To our surprise we found that in the 16 oz. Melton and 30 oz. Kersey, just the opposite prevailed. The piece dyed gained not more than ten per cent generally. Whereas the wool dyed showed a strength increase up to thirty per cent. Why? This is a question on which future studies can be made.

About leaving acid in woolen goods in order to meet the strength requirements is a question which made plenty of trouble for the Swiss "Navy" in the first five woolen mills on the merit of using sulfuric acid in the last rinsing bath to bring up the breaking strength of pieces in order to meet specification.

Because of heavy penalties imposed and their suspension from further Army deliveries the five mills brought the matter to court. The case lasted several years with the result that the mills which were able to prove that their material met the strength specification after neutralizing of the acid, were cleared. But the Army changed the specification in stipulating that uniform cloth must give a neutral reaction against lithmus paper when delivered.

The mill I worked in in Switzerland was one of the mills involved and it was one of my first problems as wool chemist to study this acid reaction. Under the influence of diluted sulfuric acid the wool fibers shorten up through a crimping effect, thereby increasing the density of the cloth and respectively its strength. As soon as you neutralize the fibers again the effect is removed and the strength gain lost.

That this is so, was brought home very vividly to me. In the same mill, ten pieces of overcoating were still on hand from the court case. As we could not sell them directly to the Army, they were bought by another mill and sold to the Quartermaster. When delivered, they were rejected as being on the acid side. After contacting us, the mill was advised to neutralize the pieces. The neutralized pieces were offered and rejected the second time on the basis of not meeting the strength specification.

The disgusted customer returned the pieces to us. I found the pieces strong on the alkali side with over two per cent soda. So I neutralized them back with formic acid until neutral. They were sent back to the customer, who in turn, with a certain amount of hesitation, presented them for the third time to the Army authorities, who to his surprise, accepted them. So you see that it is possible to change the breaking strength up and down with the help

of chemicals, and as in this case, to the extent of twenty per cent or more, it is something to think about.

I agree with Mr. Christison that by neutralizing carbonized pieces with water alone, you cannot reduce your acid content economically much lower than 2 per cent, even by rinsing a whole day. It is an established fact that pieces dyed with acid colors contain about two per cent acid, which is necessary for proper fastness. But we also know that under rigid exposure to sunlight many colors especially chrome colors, fade far more in the presence of sulfuric acid than they do under neutral conditions.

Mr. Christison: We should develop some adequate method for determining the amount of indigo in some of these indigo dyeings. Some of the samples that have been represented as being passed by the Navy have given us difficulty in finding any indigo.

Mr. Derby has good advice for showing up the overhand and showing the apparent indigo, but there is one real means and that is an adequate method for determining the indigo in the goods, or the amount of the indigo.

Mr. Claflin: There was a test used frequently whereby burning a piece of the fabric and catching it on a cold inverted porcelain dish you were able to make a pretty guess. You can do it more accurately by indigo rims. That is the way we made the rough and ready test when a competitor's goods came along.

Mr. Harrison: Having had experience with acid I wonder if there is much acid left in the Navy materials. What would happen if a strong wind blew?

Mr. Derby: I will take the opportunity of attempting to answer that question. Frankly, I do not believe, and I support this by several years experience on the use of Neolan colors in which large amounts of acids are used and in which the goods are simply washed after dyeing, that the effect on cotton fibers in contact with that wool is appreciable. Even rayon threads and cotton threads don't seem to deteriorate to any degree. I feel sure in saying that the amount of acid left in the wool which, as Mr. Von Bergen and Mr. Christison both stated, is held very tenaciously and cannot be washed out, will not have any disruptive effect that would be appreciated on cotton effect threads or cotton binders or any decorations at all.

Mr. Christison: How about the skin?

Mr. Derby: That is a mute question. I don't want to get into the subject of dermatitis. There have been thousands and thousands of yards of men's wear flannels which are used for sports wear and which come in contact with the skin and which, as far as I know, never have caused any serious trouble.

Dyed with Neolan colors they stand perspiration very well. I never heard of an instance where anyone had dermatitis from it. Maybe someone else has. It is customary in the mills to use formic acid to increase strength on government fabrics. It is done in a great many instances. Probably many of you here have done it and, as far as I know, it is a legitimate procedure. Take serge. If the strength is down a little, a bath in formic acid will bring up the strength very frequently five or ten per cent, which may be necessary to meet specifications. I never heard of any bad results from it and, as far as I know, it has been accepted without question.

Mr. Deady: I have seen some of the rayon linings after they have been put in a coat and steam-pressed and they would turn red. The only way we could duplicate it is by touching them up with acid.

Mr. Derby: The acetate fibers are sensitive to a lot of things. I hope you don't get them mixed up too much with wool.

Mr. von Bergen: I would like to make some additional remarks about the strength. I had the pleasure a few weeks ago of visiting the plant of Mr. Rindge. Very much interested in the influence of the indigo piece dyeing process on the strength of the goods, I was presented with some flannel samples before dyeing and finished. I tell you that never in my life have I tested a flannel which was as strong as that. This piece not only was far above the 35 lb. specification for the flannel, but even well within the 16 oz. Melton specification (58 lb. warp, 46 lb. filling). If you can do this with chrome colors—well, you never will do it!

MEETING, PIEDMONT SECTION

THE Piedmont Section held their summer meeting at the Robert E. Lee Hotel, Winston-Salem, North Carolina, on Saturday, June 5th.

This meeting was divided into two sections, namely, afternoon technical meeting and night banquet meeting.

The afternoon technical session was divided into three separate meetings or groups and were presided over by the various individuals outlined below.

Ernest Caswell, Supt. of Dyeing, Cloverdale Dye Works, High Point, North Carolina presided during the discussion of "Hosiery Dyeing, Ingrain and Piece."

John Neely, Supt., Burlington Mills, Yarn Dyeing Division, Burlington, North Carolina presided over the discussion on the paper "Dyeing and Finishing Acetate Rayon and Nylon" by E. R. Hopkins, Supt. of Dyeing and Finishing at the Stonecutter Mills, Spindale, North Carolina.

Sidney M. Cone, Proximity Print Works, Greensboro, North Carolina presided over the discussion of the paper on "The Dyeing and Finishing of Cotton Piece Goods for the Government" by McGee Calhoun, Dyer, Erwin Cotton Mills, Cooleemee, North Carolina.

At the night banquet meeting the Association heard a most interesting and impressive talk on the trends of government in the present and post war outlook.

Respectfully submitted,

L. G. ATKINS, *Secretary*.

Dyeing and Finishing of COTTON PIECE GOODS for the Government

M. McGEE CALHOUN, JR.

Erwin Cotton Mills Co.

I HAVE been asked to prepare a technical paper on dyeing and finishing of cotton piece goods for the Government. As most of our work on dyeing for the Government consists of using vat colors, I will discuss this type with which I am the most familiar.

To begin with, a dyer needs goods that are suitably prepared. The goods must be singed and desized, then allowed to stand for from two to four hours in order to convert the starches into sugar. The goods are then washed out and ready for scouring either in the kier in rope form or on a boil-off machine in open width.

The goods that are placed in a kier must be boiled from eight to twelve hours in 3 per cent of caustic and 20 pounds soap—under pressure. The kier is then cooled down and the goods drawn out in rope form and washed, then run through a solution of chemic, one degree to one and one-half degree Tw, and allowed to stand about an hour, after which they are run through a weak solution of sulfuric acid or SO_2 gas to kill the chemic. Then they are washed and ready for drying. In using the rope form method, goods must be run slack at all times with very little squeeze on the rolls to avoid rope marks which will appear very easily in heavy twill and herringbone goods.

In the open width method the goods are scoured on a boil-off machine or in jigs in a strong solution of caustic which is titrated to keep it the same at all times. It takes from four to six hours through these machines, then the goods are ready for washing and bleaching through open width machines. The goods are then soured, dried, and ready for mercerizing.

The goods are run through the mercerizer using 50° Tw. Caustic, then soured and dried. To get an even dyeing, goods may be run through some penetrant and dried, or the penetrant may be added to the dye liquor before padding, if it is a penetrant that does not foam. When the goods are thus properly prepared, at least one-half of the trouble a dyer has is overcome.

In the continuous machine method, the cloth is run through reduced dye in the padder, then through big boosters containing 60 pounds caustic, 30 pounds hydro, and 600 pounds salt. Enough dye is worked out by formula to keep the dye that is padded on the cloth from washing off. The cloth is then washed and oxidized through chrome and acetic, or peroxide, or Textone and bicarbonate, to give the dye its true shade. Then the goods are washed, soaped, washed again, and dried. In making out the dye formula, the right dyes are selected to meet Government Specifications and worked out together to get the desired shade. It is best to use dyes that have the same working temperatures and exhaust as nearly alike as possible. The dye is weighed out, strained, and made up in water to the desired volume and temperature. The amount of caustic needed is added, and sometimes a penetrant to give a white foam in reduction. Dye in reduced form will not last much over an hour, so it is best to add the hydro to small volumes of the dye that is made up so as to use the reduced dye as it is needed. A penetrant which gives a white foam will help to keep down dye spots.

For the pad pigment method, the right amount of dye is weighed out, strained and made up to the desired volume in water. The cloth is run through the dye on a heavy set padder on rolls. These rolls, all having about the same yardage, are put on jigs and run down through caustic in about 100 gallons of water at the desired temperature. On the next end, hydro is added to the bath to reduce the dye on the cloth. A certain amount of hydro is added on two more ends, until all the hydro needed is put in the jigs. The cloth may be given four to six ends through hydro until the desired shade is achieved, after which this liquor is dropped and the cloth washed through running water two ends, then the cloth is run through an oxidizing bath of chrome and acetic, or peroxide, or textone and bicarbonate, at 140 degrees temperature. After three ends the cloth is washed and ready for soaping, either on the jigs or the cloth is batched on shells and soaped through an open soaper to save time on the jigs.

After the goods are dried, whether they have been run on jigs or on the continuous machine, they are run through some Sanforizing oil to aid in Sanforizing.

Some Government goods call for water-proofing, so these goods are run through some synthetic resin or water-proofing compound and dried at a very high degree of temperature before Sanforizing. After the goods are Sanforized, they are yarded off, inspected, shaded, and packed, ready for shipping.

DISCUSSION

Discussion following Mr. Calhoun's paper developed

*Presented at meeting, Piedmont Section, June 5, 1943.

the following information:

The size of the jig roll depends more on the capacity of the jig than on any consideration of shading end-to-end, but to reduce the end shading of most formulas, some of the pad liquor can be added to the jig without much increase in cost of dyeing.

Textone for oxidizing leaves goods softer, at about the same cost as chrome-acetic. They will then Sanforize better. Textone might be less desirable when cloth is intended for wax-emulsion water-repellent finish. Textone should be used with sodium bicarbonate, when used with acetic acid it gives off dangerous fumes.

The Cole spray was endorsed for wetting cloth at the Sanforizer.

Herringbone Twill shade 7 was reported as costing twice as much for dyestuffs as the shade 8.

Mercerizing is done in the grey, desized, boiled, and even dyed state. It seems to depend on where the mercerizing range is located in the plant. Mercerizing in the grey seems to require a penetrant, and some troublesome resists have followed. Some are mercerizing wet, some dry; those who mercerize wet must first establish a uniform moisture content so that a balanced feed of caustic can be set up; this is done by setting up a dip beyond the mangle, followed by a squeeze, leaving about 60 per cent moisture in the goods going to the mercerizing range. The English type mercerizer is preferred for heavy goods, but the tenter type is more versatile. 50 degree Tw. caustic seemed right. Recovery and re-use of caustic was as varied as the plants represented. Temperature of caustic had no effect on appearance of the cloth, but saved some money as the temperature was lowered.

Mineral oils in warp size, no matter how pre-treated, or in whatever minute quantity, were unanimously condemned. Tallow was recommended, but no substitute for tallow was brought forward. Cloth to be printed was less likely to be bothered by presence of mineral oils than cloth to be dyed.

Pad-jig dyeing: time between padding and dyeing is unimportant chemically. Mechanically, the drying of edges might give trouble.

Various speed and temperature factors were exchanged, and the meeting broke up into smaller groups discussing details not covered sufficiently in the broader conversations.

MEMBERSHIP APPLICATIONS

Junior

Nathan Isseks—Asst. to Control and Production Engineer, David Cummings, Inc., Bennington, Vt. Sponsor, W. R. Katzell.

Jack D. Towery—Textile Engineer, Bureau of Industrial Chemistry, University of Texas, Austin, Tex. Sponsor: M. E. Heard.

Roscoe Will Grimminger—Dyer, Somorkond Rugs, Inc., Rock Hill, S. C. Sponsors: G. R. Howard, C. B. Ordway.

Associate

Allan James Nelson—Superintendent, Springfield Woolen Mills Co., Springfield, Tenn. Sponsors: W. E. Hadlay, F. F. Myers.

ONE HUNDRED AND FORTY-SECOND COUNCIL MEETING

THE Council held its one hundred and forty-second meeting in the Providence Engineering Society Building, Providence, R. I., on Saturday morning, June 19, 1943. Present were Vice President Roland E. Derby presiding, and Vice President Charles A. Seibert; Wiliam R. Moorhouse, Treasurer; Louis A. Olney, Chairman of the Research Committee; William H. Cady and Carl Z. Draves, Past Presidents; Harry M. Hartnett representing Northern New England; Allison R. Fletcher and Ben Verity representing Rhode Island; Kenneth H. Barnard, J. Robert Bonnar, J. Ernest Meili and George A. Moran representing New York; Bertil A. Ryberg, Associate Research Director; and Harold C. Chapin, Secretary.

The Secretary's report of the 141st Council meeting and financial report of June 12, and the Treasurer's report of June 18, were accepted. Recent action of President Thomas R. Smith with regard to press releases of the American Standards Association was approved; and the Council's vote of October 10, 1942 was reaffirmed, to effect that in relations with American Standards Association Committee L-14 the Association is concerned with tests rather than policies. An offer was received from the Howes Publishing Co. to finance the annual award of a medal. Thanks were voted, and Carl Z. Draves was appointed to confer with Mr. Howes. It was the sense of the meeting that the next Council meeting should be in New York on October 23, provided that this be consistent with plans of A.S.T.M. Committee D-13, the A.A.T.C.C. International Contest Committee, and the New York Section, for meetings in the same week.

The Hanes Dye and Finishing Co. was elected to Corporate membership. Each of the following was elected to the class of membership specified, as of thirty days from publication of application, provided no objection be received meanwhile by the Secretary.

Senior

E. Bagguley	C. J. Carroll	J. G. Ferguson
L. W. Bass	M. A. Cola	R. W. Freeze
R. I. Bosworth	W. A. Colby, Jr.	J. D. Friend
J. J. Campanini	H. F. Creegan	G. S. Garvin
E. J. Capuano	J. Eid	S. B. Groff
G. L. Carn	F. L. Fennell	J. P. Guerin

SECRETARY'S FINANCIAL REPORT — JUNE 12, 1943

Received and transmitted to Treasurer	*Applications*	*Dues, Regular and Reinstate*	*Dues, Corporate and Sustaining*	*Miscellaneous*	*Totals*
August 1, 1942 to April 9, 1943	$1,110.00	$12,614.75	$5,947.50	$1,315.84	$20,988.09
April 9 to June 12, 1943	352.50	252.00	375.00	432.23*	1,411,73
Total in fiscal year to date	1,462.50	12,866.75	6,322.50	1,748.07	22,399:82
Leaving deposited by Treasurer with Secretary					$2,000.00

Miscellaneous Items*

Year books	$58.80	Knitted tubing	30.00
Reporters	43.12	Dyed standards	27.00
Reprints	2.00	Water test apparatus	38.04
Buttons	23.00	Gas fading blue prints	2.00
Moth cloth	50.50	Standard gray cards	6.00
Crockmeter profits	74.75		
Crock cloth	77.02		$432.23

A. J. Henault, M. J. Henault, S. L. Hermann, C. A. Heydon, W. A. Hickman, V. B. Holland, E. C. Jensen, W. H. Jones, J. W. Kinsman, K. H. Krasley, L. W. Lanterman, L. Loescher, L. F. Mayo, D. E. Morgan, R. O'Hara, R. C. Patton, F. Polgar, W. L. Pontius, E. E. Price, S. G. Sanders, A. J. Sullivan, A. A. Talarico, F. R. Tripp, H. A. Turner, H. B. Walker, H. G. Watson, P. Wengraf, E. B. Whitworth, T. K. Williams

Junior

R. W. Grimminger, N. Isseks, L. M. O'Leary, W. T. Rhodes, J. D. Towery, R. Uribe, M. Wunsch

Associate

A. Berli, J. A. Beattie, J. G. Chalmers, T. B. Dorris, J. C. Drake, J. P. Flanigan, A. Leitstein, A. J. Nelson, W. P. Schumacher

Student

J. Varon

Paul J. Luck was transferred from Associate to Senior membership.

Respectfully submitted,

HAROLD C. CHAPIN, *Secretary.*

◆ ◆

INTERSECTIONAL CONTEST

THE annual Intersectional Contest will be held on Friday evening, October 22nd, 1943, at the meeting of the New York Section. Kenneth H. Barnard, chairman of the Intersectional Contest Committee, has asked each section to submit 12 copies of its paper to him by October 1st in order that the judges may preview the papers. The awards will be made the evening of presentation.

Twenty minutes will be allowed for the presentation of each paper, the order of presentation to be determined by Dr. Louis A. Olney, who will preside over the judges. The following scale of values, which have been revised, will be used in judging the papers: practical value—30%; scientific value—30%; originality—30%; presentation—10%.

Several of the papers presented last year were very helpful to the Association's research committee and to the war effort of the entire textile industry. It is anticipated that the contest this year will also result in valuable contributions to the textile industry.

◆ ◆

APPOINTED VICE-CHAIRMAN, MEMBERSHIP COMMITTEE

PATRICK J. KENNEDY, chairman of the New York Section, has announced the appointment of Miss Bernice S. Bronner as vice-chairman of the membership committee. This appointment is unique in that it is the first time that a woman has been vice-chairman of a

Miss Bernice S. Bronner

standing committee for this section and this fact is probably true for other sections also.

Miss Bronner is thoroughly familiar with the textile industry from the point of view of both the manufacturer and the consumer as she is now in charge of the textile laboratory of Good Housekeeping Institute and was previously with the laboratory of Brown Durrell Co. She has been secretary of the American Association of Textile Technologists for the past 7 years and is a member of Home Economics Women in Business. She served as chairman of the ladies' committee for the twentieth annual meeting and convention held in New York in 1940.

ONE HUNDRED AND THIRTY-FIFTH MEETING OF THE RESEARCH COMMITTEE

THE 135th meeting of the Research Committee followed the Council meeting in the Providence Engineering Society Building on Saturday afternoon, June 19, 1943. Present were Chairman Louis A. Olney presiding, W. D. Appel, P. J. Ariente, K. H. Barnard, E. C. Bertolet, J. R. Bonnar, W. H. Cady, H. Christison, L. S. Converse, R. F. Culver, R. E. Derby, C. Z. Draves, W. C. Durfee, C. W. Fleming, A. R. Fletcher, J. E. Goodavage, T. Goulet, H. M. Hartnett, A. E. Hirst, N. A. Johnson, D. P. Knowland, E. D. Lind, J. E. Meili, C. J. Monego, E. F. Monroe, G. A. Moran, F. A. Prisley, B. A. Ryberg, C. H. A. Schmitt, C. A. Seibert, F. T. Simon, H. W. Stiegler, F. Tripp, B. Verity, H. L. Young, and H. C. Chapin, secretary.

Mr. Bonnar reported that his committee, in consultation with a committee of the National Association of Finishers of Textile Fabrics, had arrived at the compromise on use of standards for which it had been appointed at the April Research Committee meeting; and Mr. Ryberg reported that this compromise would be incorporated in Bureau of Standards CS-59-43, to the effect that the dyed standards of the Association would be the basis for calibrating test procedures stated in terms of "appreciable fading" in descriptions of the actual tests. It was, however, the opinion of a majority of those present, that despite the compromise, direct comparison of the standard with the test sample would be preferable.

There was discussion of whether carbon tetrachloride should be retained in the fastness to dry cleaning test in view of its poisonous character and wartime scarcity of chlorinated solvents. Its employment in the test was defended, despite the small volume in present or contemplated use for dry cleaning, because of the prescribed use of such solvents under city fire laws for congested districts. Danger from poisoning was said by Mr. Seibert to be negligible over short periods of exposure with intermediate clearing of lungs. According to Mr. Christison, damage to colored fabrics is due principally to hot pressing before complete removal of the chlorinated hydrocarbon, causing reaction with any water present to produce free hydrochloric acid. There was also discussion of various perspiration tests, with emphasis on the need of agreement by various agencies on some test more satisfactory than any now in use. It was voted that a special fabric be prepared for washing and perspiration tests, with wool, cotton, silk, viscose, acetate and nylon woven in checks.

It was reported that exposures of olive drab fabrics by the Quartermaster Corps was already under way, and that with the exposures in Lowell were others of olive drab, and indigo substitutes. The Army's hesitation to settle on any one olive drab formula was said by representatives of the Quartermaster Corps to be due in part to lack of dyes of recognized fastness available like indigo from many manufacturers. Mr. Simon presented a report from the Committee on Ageing of Sulfur Dyed Textiles, stating that no specific accelerated ageing test was recommended, that interest of the Quartermaster Corps was less pressing, but that work would continue. He reported for the Committee on Color also, with particular reference to recent work on American Standards Association specifications.

Mr. Appel reported that the Committee on Fastness to Light had selected some of the blue dyed pads prepared by Mr. Christison as preliminary standards, that knitted standards would now be prepared, and that on approval of these, woven fabrics would be manufactured. Mr. Moran reported progress on a scrubbing test based on modifications of the Crockmeter and Aridye machine. To investigate reported variations in performance of machines for weathering tests, Henry L. Young was appointed Chairman of a committee. On recommendation of Dr. Draves, the tentative method of Comparison of Wetting Agents for Mercerizing Liquors was voted official.

Respectfully submitted,

HAROLD C. CHAPIN, *Secretary*.

UNEMPLOYMENT REGISTER

A-2

Education—Graduate, Lowell Textile Institute, B.T.C., 1933.

Experience—Experienced as textile chemist, chemist-spotter, agricultural chemist and U. S. Army inspector on cotton, rayon, woolens and worsteds. Seeks research or control position with future. New England preferred.

Age 34; married; references.

A-3

Education—B.S. in chemistry, Lehigh University.

Experience—Experimental engineer and analytical chemist, 8 mos.; assistant superintendent of silk corporation, assisted in planning and directing production, in charge of laboratory, technical work, personnel, purchasing, etc., 2 years; inspector of ordnance material, to the present. Seeks position as chemical engineer or chemist.

Age 26; single; references.

C-1

Experience—Experienced as assistant finisher, finisher and superintendent of finishing since 1923. Experience on automobile cloth, boucle overcoatings, high grade men's wear worsted, low grade woolens, medium grade plaid-back overcoatings, fleece finish overcoatings. Bolivias, kerseys, medium-grade men's piece dye suitings, uniform cloth, flannels, ladies' dress goods and coatings, government serge and elastique fabrics, marine wool, flannel shirtings.

Age 37; married, 3 children; references.

OBITUARY

ROBERT R. WILLGOOS

ROBERT RANKIN WILLGOOS, salesman for Leatex Chemical Company, Philadelphia, died suddenly on July 1, after an illness of several months. For several years Mr. Willgoos represented the Leatex Chemical Company and his headquarters were in New York City. He was a member of the New York section of the American Association of Textile Chemists and Colorists.

• OFFICERS, A.I.C.

At the annual meeting of The American Institute of Chemists, held in Chicago, Donald B. Keyes, Chief, Chemical Industries Branch, Office of Production, Research and Development, War Production Board, and Raymond E. Kirk, Brooklyn Polytechnic Institute, were elected to serve three year terms as Councilors of the Institute, and Frank G. Breyer, of Singmaster and Breyer, was elected to serve in the same capacity. These elections fill the Councilors' terms expiring in 1943. Frederick A. Hessel, President of the Montclair Research Laboratories, was designated Treasurer.

Other officers of The American Institute of Chemists are President, Gustav Egloff, Universal Oil Products Co., Vice-president, Donald Price, National Oil Products Co.; Secretary, Howard S. Neiman, patent attorney and Editor, "Textile Colorist"; Councilors at large: Donald H. Andrews, Professor of Chemistry, Johns Hopkins University; Stuart R. Brinkley, Associate Profesor of Chemistry, Yale University; Harry L. Fischer, Director of Organic Research, U. S. Industrial Chemicals, and The Air Reduction Co.; Frank O. Lundstrom, Bureau of Plant Industry, U. S. Dept. of Agriculture, Beltsville, Maryland; Robert J. Moore, Manager, Development Laboratories, Bakelite Corporation; Foster D. Snell, President, Foster D. Snell, Inc.; W. D. Turner, Assistant Professor of Chemical Engineering, Columbia University.

• TWENTY-FIVE YEARS SERVICE

Frank H. Griffin, vice-president and technical director of the American Viscose Corporation, has completed 25 years of service with the company and was honored recently at a luncheon given at the Hotel DuPont, Wilmington, Delaware. William H. Brown, secretary and treasurer of the corporation, presided and presented Mr. Griffin with the company's 25-year service pin. Others present included officials of the corporation, the managers of the company's seven rayon-producing plants, and the heads of the various research departments and laboratories.

Mr. Griffin joined the company as a chemist in May, 1918, and was appointed Chief Chemist in 1922. He was made Technical Manager in 1925, and in May, 1933, was elected a member of the Board of Directors. Two years later, in 1935, Mr. Griffin was made a Vice-President and in 1938 he was appointed Technical Director of the corporation.

Mr. Griffin has played an important part in developing the processes used in the manufacture of rayon, which in turn have resulted in improving the quality of rayon during the past 20 years.

• AMENDED DYESTUFF ORDER

The War Production Board has extended present restrictions on the sale and use of dyestuffs and pigments to cover all but four specific dyes.

The action, taken with amendment of Order M-103 (Dyestuffs and Organic Pigments), sets up quotas retroactive to July 1 on use of dyestuffs.

The four colors still exempt from provisions of the order are known as "Lake colors" and are used as coloring matter in paints and printing inks. Paint manufacturers and lithographic ink manufacturers will not be subject to any limitations on their purchases of these dyes.

Prior to the amendment there were approximately 250 miscellaneous colors not under domestic restrictions. These were synthesized generally from chemicals now required for military purposes. Recently, new procurements have been issued for vat colors and in addition many of the facilities for manufacturing these formerly exempted colors are being converted to the manufacture of chemical products for synthetic rubber, gasoline, pharmaceuticals, etc. As a result, these materials are no longer freely available, thereby necessitating the restrictions on all except these four specified colors, namely: Lithal Red Cl 189, Azo Bordeaux Cl 88, Alphanaphthylamins Maroon Cl 81, and Pigment Green B. By specifying these types in the order, it is felt that confusion will be avoided.

Other changes in the amended order include the provision for a 21-day extension over a specific quota period to provide for possible delays in shipment. With this extension of time, the purchaser of dyestuffs will be enabled to include a delayed order in his quota for the current quarter even though the period of the quarter for which it was ordered had passed.

The 21-day extension also makes it possible for the purchaser of dyestuffs to return to the vendor unused quantities any time before the 22nd day after the end of the calendar quarter in which the dyestuffs were delivered, if the vendor is willing to accept delivery. These will not be charged to the purchaser as delivered or accepted.

The order also requires a further two per cent reduction of the total value of dyestuffs exported or delivered for export from the United States to any place other than Canada. Henceforth, exports in any one quarter will be limited to 15 per cent of the total exports during 1941.

Added to the list of exemptions from the order is the United States Post Office, and dyestuffs used for coloring of tractor fuels.

(Conservation Order M-103, as amended, effective July 3, 1943..)

• ORDER M-242 REVOKED

Increased production of sulfamic acid and its derivatives has made it possible to revoke Order M-242 governing allocation of these materials, the War Production Board announced.

Sulfamic acid and its derivatives are used in flameproofing textiles, as leather softeners, in the manufacture of dyestuffs and dry colors, and for electroplating. Sulfamic acid derivatives are also used as weed-killers. Order M-242 was issued originally on October 3, 1942.

Revocation of General Preference Order M-242 was effective July 6, 1943.

• PATENT LICENSES

In view of the steadily growing demand for licenses under patents seized from enemy owners, Alien Property Custodian Leo T. Crowley has announced liberalized terms for the issuance of licenses to American business by his office:

Beginning August 1, 1943, the fee for obtaining a license to use enemy owned patents held by the Alien Property Custodian will be a flat $15 for each patent. Hitherto, licenses have been issued for a fee of $50 for a single patent plus $5 for each related patent included in the same license.

The new arrangement, Mr. Crowley said, will make it easier for small manufacturers to put single patents promptly

to work. It also will more equitably compensate the APC for work involved in searching out contractual agreements that already exist on specific patents.

Main effect of the change will be to streamline procedure necessary to put seized patents to work in American industry. In the past considerable time has had to be devoted to determining whether several patents covered by a single application were in a 'related' field. Under the new system the class similarity of patents covered by an application will not have to be considered.

Information concerning the 40,000 patents and patent applications now held by the Alien Property Custodian can be obtained by addressing the Office of Alien Property Custodian, Field Building, Chicago, Ill. Except for those patents which already were exclusively licensed to American industry prior to seizure, patents which formerly belonged to enemy nationals are now available under license on a non-exclusive, royalty-free basis for the life of the patents.

Mr. Crowley reiterated that in accordance with his understanding with the President, no patents or patent applications held by him as Alien Property Custodian are offered for sale. Nearly all, however, are freely available under the liberal licensing policy of the APC.

• ALLOCATION OF ANILINE

Provisions for use of standard allocation forms WPB-2945 (formerly PD-600) and WPB-2947 (PD-602) and end use certificates in the allocation of aniline, important chemical in the manufacture of explosives, dyes, drugs, synthetic rubber and other products, are contained in an amended order issued by the War Production Board. Three exhibits annexed to the order give specific instructions for the filing of information.

Allocation Order M-184, as amended, provides that no supplier shall deliver aniline to any person except as specifically authorized in writing by WPB, upon application pursuant to Exhibit A. No person may accept delivery of 5,000 pounds or more of aniline in the aggregate in any month beginning with August except as specifically authorized on application pursuant to Exhibit B. A person seeking to accept delivery of from 500 to 5,000 pounds of aniline in any month beginning with August must furnish each supplier with an end use certificate pursuant to Exhibit C.

Acceptance of delivery and use of 500 pounds or less of aniline by person is exempted from WPB authorization. Today's amendments to Order M-184 do not affect authorizations issued under the order prior to this date.

Exhibit A, annexed to the order, provides that each supplier seeking authorization to make delivery of aniline must file Form WPB 2947 (PD-602) in time to reach WPB by the 20th of the month preceding that for which authorization is sought. On this form will be listed customers who have filed WPB-2945 (PD-600) forms with the applicant and customers who have filed end use certificates with him, also the end uses stated in the certificates and the aggregate unlisted small orders (500 pounds or less).

Exhibit B gives instructions for filing applications for authorization to use or accept delivery of aniline. Applications for authorization to accept delivery of 5,000 pounds or more of aniline from all suppliers in any month must be filed on Form WPB-2945 (PD-600) in time to reach the supplier and WPB by the tenth of the month preceding that for which authorization is sought.

Exhibit C gives instructions for filing certificates of use with purchase orders for persons ordering between 500 and 5,000 pounds per month from all suppliers.

Allocation Order M-184, as amended, issued July 5, 1943.

• CIBA REVIEW

Number 45 of the *Ciba Review*, March, 1943, features the following subject: "The Crafts of the Puszta Herdsmen." Articles are described by the following titles: The Puszta; Herds and Herdsmen of the Puszta; The Crafts of the Puszta Herdsmen; Notes. There are many interesting illustrations.

• AWARDED "E"

The Marcus Hook, Pa., plant of the American Viscose Corporation, the oldest rayon producing plant in the United States, has been awarded the Army-Navy "E" for outstanding performance on war work. This is the first "E" award to be made to a rayon-producing plant. The Marcus Hook plant, which commenced production in 1911 and pioneered the production of rayon in this country, has been engaged for some time in making higher strength rayon yarns for use in fragmentation bomb parachutes, aerial delivery parachutes, aerial tow targets and other military equipment. The presentation ceremonies were held at the plant on July 14.

• COLORS FOR MEN'S FELT HAT BODIES

Three distinctive new colors, all having a softened greyed undertone, are shown in the 1944 *Spring Card for Men's Felt Hat Bodies*, just issued by The Textile Color Card Association to its members. These shades comprise Grayblu, in the slate blue range, Claybrown, a light subdued brown and Sagegreen, a muted greyish green.

As usual, these hat shades are portrayed in large swatches of fur felt, with a sample of the matching hat band. Mrs. Rorke stated that the men's hat colors were limited to three, in keeping with the Association's wartime conservation policy. All three shades, she added, were chosen for their style value and for their adaptability for dyeing on fur felt stock and wool felt stock. A committee representing leading firms in the men's hat industry cooperated with the Association in the selection of the three new colors.

• BOOKLET ON DRESINATE

A new booklet discussing properties and uses of Dresinates, water soluble resinates, in soluble oils has just been issued by the Paper Makers Chemical Department of Hercules Powder Company.

Dresinates come in two forms, a powder, Dresinate X and a liquid, Dresinate 90. Both are used in cutting oils for metal working, for dispersing germicidal disinfectants throughout water, in leather treating oils, textile oils, and other emulsions.

Tables giving the properties of liquid and powdered Dresinates and figures and tables showing the improved stability of emulsions made with Dresinate 90 are included in the booklet as well as directions for preparing a typical emulsion.

The booklet cites the advantages of using Dresinate 90 with petroleum sulfonate, commonly used emulsifier now on allocation, to extend the emulsion as well as improve its stability and lightness of color. Less odor and in some cases less sludging result from using Dresinate 90 in these emulsions, the booklet states.

Copies of the booklet on Dresinate in soluble oils can be obtained by writing to the company.

• CHEMICAL INDUSTRY MEDAL

Dr. John J. Grebe, Director, Physical Research Laboratory, Dow Chemical Co., Midland, Michigan, has been elected to receive the Chemical Industry Medal for 1943. This award, which may be made annually at the discretion of the medal committee, is for valuable application of chemical research to industry. The medal will be awarded at a meeting of the American Section of the Society of Chemical Industry to be held in New York City in November 1943.

Dr. Grebe was born on February 1, 1900 at Uerzig, Rhineland, Germany and came to America in 1914. He was graduated from Case School of Applied Science in 1924 with the degree of Bachelor of Science in Physics. In 1928 he received the degree of Master of Science and in 1935 he was awarded the honorary de-

gree of Doctor of Science by his Alma Mater.

Following his graduation, Dr. Grebe became research physicist under the direction of the late Dr. Herbert H. Dow, president of the Dow Chemical Company. Since that time he has built up a research department employing about 140 technical graduates and other scientific workers, which has made contributions of fundamental importance to the fields of applied chemistry and physics.

Dr. Grebe invented the method for the extraction of bromine from sea water resulting in the establishment of a commercial plant at Wilmington, North Carolina which has been in successful operation for about 10 years.

• SULFATATE

Greater speed in application and adhesion of surfaces using water soluble adhesives is now claimed to be possible through the use of small amounts of a special wetting agent marketed under the name of Sulfatate.

Its usefulness is said to be especially marked when a few drops of Sulfatate are added to the water used in moistening paper sealing tapes (e.g., on cartons, envelopes, etc.). It is stated that much less labor and time are required in such operations because the wetting agent causes extremely rapid penetration of the solution with almost instantaneous "setting" or adhesion.

It can also be incorporated in finished glues, pastes, mucilage and silicate adhesives.

Sulfatate can be obtained from the Glyco Products Company, Inc., 26 Court Street, Brooklyn, New York.

• SPEED-UP IN "DOPING"

Speed-up of 20 to 30 per cent in the painstaking process of "doping" the cloth which covers airplane and glider surfaces is reported from the use of pre-doped fabric and a new "high-solvency" type of lacquer, both developed and now being manufactured by E. I. du Pont de Nemours & Company.

"Airplane production consumes vast amounts of special cotton fabric which must be transformed into a tough, outer hide by building it up with successive brush and spray coats of lacquer," said M. J. Callahan, manager of the Du Pont "Fabrikoid" Division. "Even metal planes have control surfaces such as rudders and ailerons covered with doped cloth, while many training planes and gliders are completely cloth covered."

Doping is necessary to produce air-tight tautness as well as for protection against rot and mildew.

Savings in time and labor accomplished by the new materials are said to substantially boost sub-assembly rates. Previous procedure called for stretching untreated cloth over sections of aircraft framework and applying dope with brush and spray-gun—interrupted by laborious sanding—through eight separate operations. Now all hand-brushing is eliminated and the total number of coats is reduced with consequent saving in drying time. Aircraft plant floor space is more rapidly freed for use.

"Two Du Pont developments contribute to this valuable saving in time and labor," Mr. Callahan said. "First, by a unique method, we were successful in lightly pretreating fabric at our Newburgh, New York, plant before shipment to aircraft factories. Our method permits saving precious solvents which we re-use over and over again. In addition, much sanding to smooth surfaces, an important factor in modern high-speed aircraft, is eliminated. The specially developed method of predoping allows retention of the pliability and tautening properties of the untreated fabric, with resultant ease of tailoring and satisfactory performance.

"Next, our laboratories produced a 'high-solvency' lacquer, or dope, containing 20 per cent more film-forming solids than this type of finish ever before contained for practical usage. Consequently, today all slow paint brush work is replaced by high-speed spraying. With this development, still further reduction in the number of coats required to finish a plane is realized."

Maximum time savings are said to be effected by combining these two developments, although each may be incorporated in present finishing systems with advantage.

• ANNUAL MEETING, I. R. I.

The Industrial Research Institute completed five years of activity with its recent Annual Meeting in New York on May 21 and 22 at the Hotel Biltmore. Seventy industrial executives and research directors, representing member companies, and their guests, attended the meeting and participated in informal roundtable conferences.

The organization of research in Great Britain and the United States, its support of the war effort and probable post war trends, was discussed at the Friday evening dinner session. Dr. G. S. Whitby, Professor of Rubber Chemistry, University of Akron, and recently Director, Chemical Research Laboratory, Department of Scientific and Industrial Research, Teddington, England presented the British picture and Dr. Robert W. King, Assistant Vice-President, American Telephone & Telegraph Co., New York, discussed the situation in this country. Dr. Whitby explained the basic differences in the organization and effectiveness of research in Britain and the United States, emphasizing the proportionately larger amount of government and trade association activity in the former country due to slower adoption of research by industry. The importance of planning now to meet post war conditions is generally recognized in Britain he said and technical research will have an increasingly important role in this. Dr. King pointed out that our own country owes an incalulable debt to applied science in this war, as evidenced by the developments from industrial research laboratories that are rapidly giving us superiority in the conflict. He felt that while the war will give great impetus to research this may be accompanied by rising costs of doing research, possibly beyond the resources of private industry. He deplored the distorted view of science held by some of our political representatives and pointed out the need for their further education in this field.

At a session on new research tools, Dr. G. W. King of Arthur D. Little, Inc., Cambridge, Mass. discussed improved calculating machines for scientific use, particularly in the field of chemistry. Dr. W. B. Rayton, Director of Scientific Bureau, Bausch & Lomb Optical Company, Rochester, N. Y. described new optical tools and their applications in various fields of industrial research.

Other sessions of the meeting were devoted to discussion of industrial research management problems. R. C. Benner, Director of Research, and G. J. Easter, Assistant Director of Research, The Carborundum Company, Niagara Falls, N. Y., described a simple system which has proved of great help in the current control of research projects. It is based on the budgeting of time rather than money. Cooperative intra-industry research in seventeen industries represented in the institute, was reviewed by J. M. McIlvain, Administrative Supervisor, Research & Development Dept., The Atlantic Refining Company, Philadelphia, Pa. He covered its history, organization and management, support of the war effort, effectiveness and future prospects. Mr. McIlvain concluded that cooperative industrial research has had an impressive growth, that it is a workable and worthwhile activity and that the varied modes of its execution demonstrate an ingenuity and vigor of attack only possible because industry has had a free hand in organizing its research activities. The rating of research personnel was discussed in four simultaneous group conferences Saturday morning, under the leadership of C. L. Bausch, Vice-President, Bausch & Lomb Optical Company, Rochester, N. Y.; J. N. Dow, Technical Director, Bigelow-Sanford Carpet

Company, Thompsonville, Conn.; R. S. Taylor, Chief Engineer, Servel, Inc., Evansville, Ind.; and H. L. Trumbull, Assistant to Director of Research, The B. F. Goodrich Co., Akron, Ohio. It was agreed that a formal system of performance rating adapted to research department employees is desirable. Suitable rating forms were proposed and will be tried out by the members of the institute in their respective research organizations.

William R. Hainsworth, Vice-President, Servel, Inc., New York, was elected Chairman of the Institutes Executive Committee for the ensuing year, and Harold K. Work, Manager of Research & Development Division, General Metallurgical Department, Jones & Laughlin Steel Corporation, Pittsburgh, was elected Vice-Chairman. Three new members of the Committee were also elected for three-year terms: A. Griffin Ashcroft, Product Engineer, Alexander Smith & Sons Carpet Company, Yonkers, N. Y.; Ralph T. K. Cornwell, Director of Research, Sylvania Industrial Corporation, Fredericksburg, Va.; John M. McIlvain, Administrative Supervisor, Resarch & Development, The Atlantic Refining Company, Philadelphia, Pa. It was announced that the Fall Meeting of the Institute will be held in Chicago.

The Industrial Research Institute, an affiliate of the National Research Council, undertakes to promote improvement of methods and more economical and effective management in industrial research through the cooperative efforts of its members. The membership is composed of fifty-five industrial concerns maintaining research laboratories. Their key executives in charge of research represent them in the activities of the Institute. It has headquarters at 60 East 42nd Street, New York. Other members of the Executive Committee are: Harvey S. Benson, Administrative Engineer, United Shoe Machinery Corporation, Beverly, Mass.; Maurice Holland, Member at Large, Division of Engineering and Industrial Research, National Research Ccouncil, New York, and Philip W. Pillsbury, President, Pillsbury Flour Mills Company, Minneapolis.

• DIASTAFOR MOVES

The Diastafor Department of Standard Brands, Inc., is now located at 40 Worth Street, Room 1200 A, New York City. The phone number is BArclay 7-1964. S. W. Fiske is manager of this department.

•CLASSIFIED• ADVERTISEMENTS

The rate for "Position Wanted" advertisements in this column is 2 cents a word—with a minimum of 50 cents per insertion. For all other types of advertisements—i.e., help wanted, machinery or supplies for sale—the rate is $6.25 per column inch or less per insertion.

WANTED: Salesman—textile chemicals and specialties. Penna. and N. J. Experienced in dyeing and finishing preferred. Write Box No. 439.

POSITION WANTED: Hosiery dyer. With several years experience in the dyeing of silk, nylon, rayon and cotton hosiery. Also khaki half hose for the Army and Navy. Thoroughly capable of making and matching of shades. Draft status 4-H. Write Box No. 444, American Dyestuff Reporter, 440 Fourth Avenue, New York, 16, N. Y.

WANTED: Textile Chemist for research on piece goods. Some experience in application of colors, finishes, resins. State qualifications fully. Write Box No. 449, American Dyestuff Reporter, 440 Fourth Ave., New York, 16, N. Y.

COLORIST OR DYER WANTED: A dyestuff manufacturer in the State of New Jersey desires man who has some experience in the processing of cotton, rayon and acetate. Must be a high school graduate or the graduate of some accredited textile school. Applicant will spend a few months in the Application Laboratory and then will be transferred to the Sales Department. In letter of application state age, education in detail, experience in detail, marital status, citizenship and draft classification, and references, if any. Write Box No. 450, American Dyestuff Reporter, 440 Fourth Ave., New York, 16, N. Y.

TEXTILE CHEMIST WANTED: Large chemical producer has opening for a textile chemist with experience in wet processing of pile fabrics. Permanent position with good opportunities. State education, experience, age and salary expected. All replies will be treated as confidential. Write Box No. 451, American Dyestuff Reporter, 440 Fourth Ave., New York 16, N. Y.

WANTED: TEXTILE COLORIST—CHEMIST for screen printing plant. Must have varied experience on all types of fabrics and dyestuffs on machine or screen printing. Give full details in first letter. Write Box No. 452, American Dyestuff Reporter, 440 Fourth Ave., New York 16, New York.

WANTED: Medium size box dye house and finishing equipment with or without jigs for synthetic fabrics. Include price and complete list of equipment in reply. Write Box No. 453, American Dyestuff Reporter, 440 Fourth Ave., New York 16, New York.

POSITION WANTED: Young textile engineer and textile chemist. Mill and laboratory experience. Draft deferred; references. Write Box No. 454, American Dyestuff Reporter, 440 Fourth Ave., New York 16, New York.

POSITION WANTED: Manager or Superintendent of production in the dyeing, printing and finishing field, thoroughly experienced, mature judgment, full knowledge of trade requirements. Will consider representing and demonstrating finishing products of responsible chemical concern. Write Box No. 455, American Dyestuff Reporter, 440 Fourth Ave., New York 16, New York.

WANTED: Southern sales representative wanted by chemical manufacturing organization in New Jersey producing a complete well established line of textile finishing specialties. Write Box No. 456, American Dyestuff Reporter, 440 Fourth Ave., New York, N. Y.

CRASHING INTO PRINT ON THE NORTH AFRICAN FRONT!

DURING all those thrilling months when the public eye was focused on the military phase of the allied battle for Africa . . . the textile industry was wrestling with the problem of supplying fabrics suitable to this particular colonial trade.

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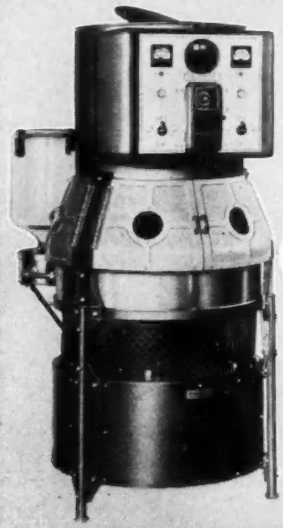

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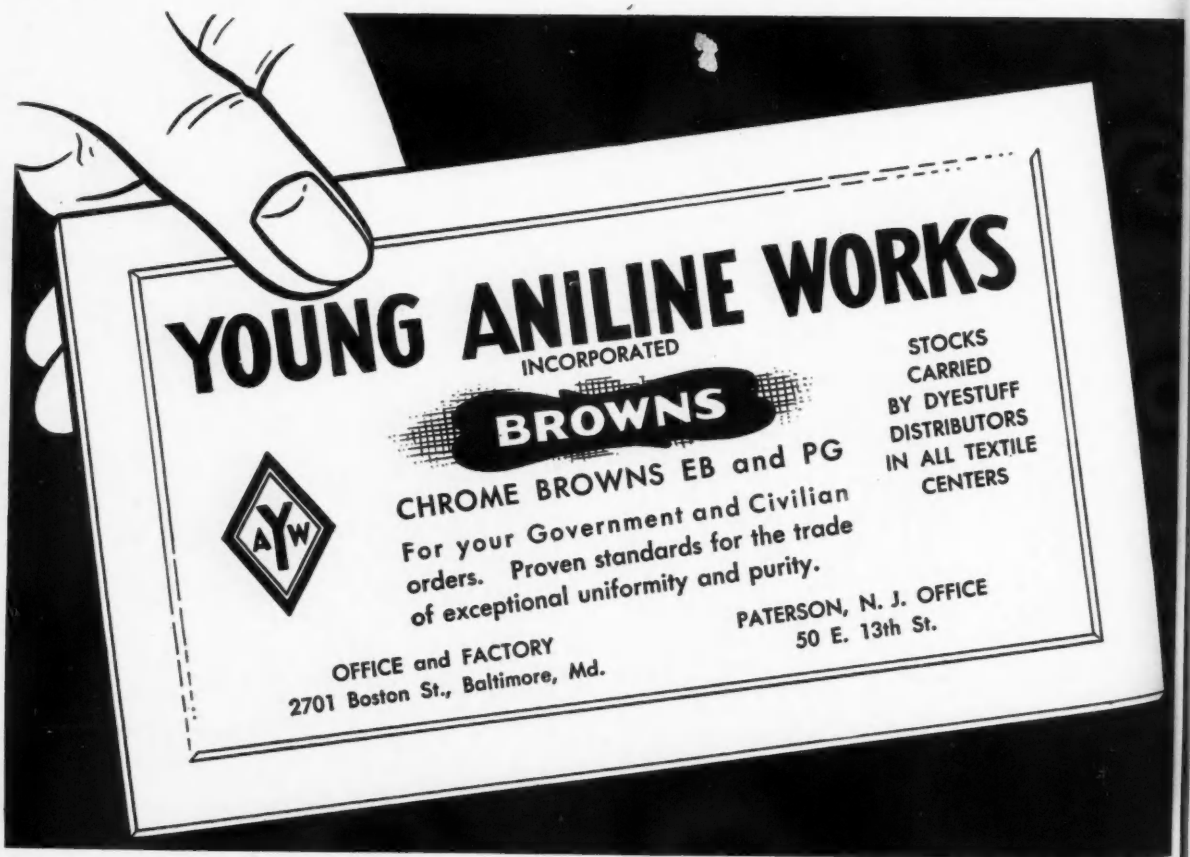
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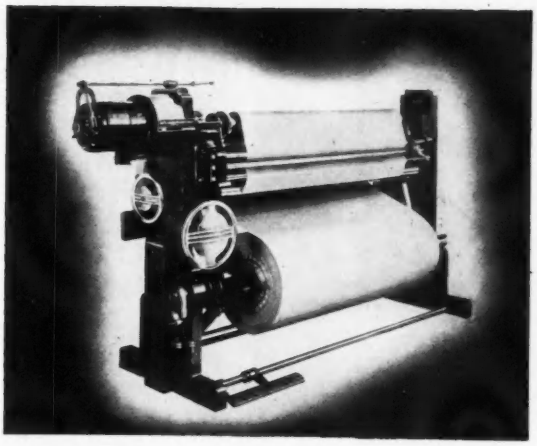

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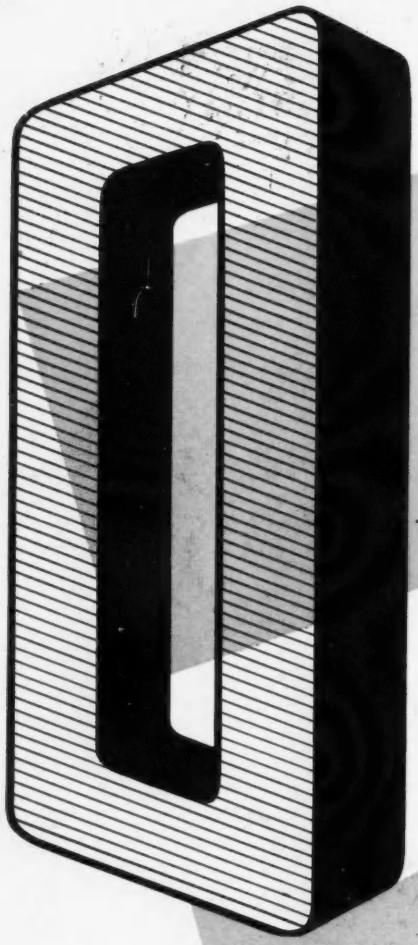

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